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COMPUTERWORLD

AT bus rides high again at IBM

BY RICHARD PASTORE
CW STAFF

IBM is expected to announce three personal computers this week that incorporate the AT bus, a capitulation to entrenched demand, according to sources briefed by the company. While IBM may be becoming less dogmatic about its Micro Channel Architecture bus, it will incorporate MCA into one other PC to be announced this week.

In all, IBM plans to introduce four Personal System/2s, dubbed Models 35, 35LS, 40 and 57SX, each of which will use the 20-MHz Intel Corp. 80386SX chip. IBM currently sells only 16-MHz 80386SX models, while many of its competitors have been shipping the 20-MHz version since last year. Analysts said the move is a hedge against an anticipated sales decline for the 16-MHz 386SX computers.

Market reality

Despite the battle over advanced bus technologies, the older AT bus continues to command the attention of users

Percent of Intel Corp.-based PC shipments (1990)	
AT bus	84%
MCA	14%
EISA	1%
Total: 8.2 million	

CW Chart: Doreen St. John
Source: International Data Corp.

Despite its reputed technological superiority, IBM's MCA has made few strides in the face of users' stubborn loyalty to the old AT bus, analysts noted.

In 1987, the company introduced MCA as a standard for its entire corporate PC line.

"That strategy failed dismally," said Frank Michnoff, an analyst at Meta Group, Inc. in Westport, Conn. IBM said it did not foresee end-user resistance to "proprietary

Continued on page 99

IBM unit finds first outsource gem at Zale

BY NELL MARGOLIS
CW STAFF

IRVING, Texas — Three weeks out of the starting gate, IBM's outsourcing subsidiary last week captured its first big deal: a 10-year outsourcing and business consulting contract with Zale Corp., a billion-dollar retail jeweler based here.

The pact will launch IBM's Integrated Systems Solutions Corp. (ISSC) unit into the lucrative retail market while helping Zale further its long-held automation strategy. Meanwhile, outsourcing vendors that view IBM's competition as unfair and illegal met in the nation's capital to urge the U.S. Department of Justice to take up their case.

Zale's Karney *has faith in ISSC*

Nearly 100 jobs at Zale will be eliminated as a result of the contract, an IBM spokesman said. David Karney, Zale's vice president of information systems, said those employees will be offered jobs within the partnership group being formed to manage the operations. The Zale data center will remain physically intact in the Dallas area but will be operated from an ISSC center in Lexington, Ky.

ISSC will manage all information processing for the huge retailer. In addition, ISSC will administer its new client's existing disaster recovery operations and

Continued on page 101

Oracle white knight wears samurai garb

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp. has found a way out of the yearlong cash squeeze that nearly brought the growth of its business to a standstill. Last week, the firm said it will obtain $200 million in financing from Nippon Steel Corp. in Tokyo.

In exchange, Nippon Steel will acquire a 49% ownership in the U.S. firm's Japanese subsidiary and the option to convert its investment into Oracle common stock. The deal could be finalized this summer.

Longtime Oracle users and industry analysts said they were comfortable with the prospect of a $19.3 billion Japanese giant financing their software supplier, mostly because it will ensure financial stability at Oracle.

"They had to give a little to get a little," said Warren Capps, president of the Mid-Atlantic Oracle Users Group in the

Continued on page 7

Rating the benchmarks

Benchmark	Very important and very familiar	Not important and not familiar
RAMP-C	2.0%	39%
TP1	1.7%	43%
TPC-A	1.0%	47%
ET-1	0.6%	49%
AIMS	0.0%	54%

Percent of respondents (Base: 297)

Percentages equal those respondents who indicated yes to both importance and familiarity criteria

Source: The Standish Group International, Inc.
CW Chart: Janell Genovese

Benchmarks score low *among those purchasing on-line transaction processing systems, according to a recent survey. See story page 101.*

Macs tune in to databases

BY JAMES DALY
CW STAFF

Moving Apple Computer, Inc. personal computers into a client/server scheme can be slogging at first, but perseverance can ultimately yield major productivity gains and financial savings, according to users who are making the effort.

A growing portfolio of client/server success stories is good news for Apple, which is pushing hard to sell the Macintosh in the corporate world. Apple took an important step when it announced its first licensing agreements for its Data Access Language, or DAL, a connectivity language that allows PC users to access relational database information from the server host [CW, April 1].

Lotus Development Corp. also announced last week that 1-2-3 for the Macintosh, which is expected to ship in the fall, will support DAL.

DAL licensing arrangements with Novell, Inc., Tandem Computers, Inc., Data General Corp., Blyth Software, Inc. and Pacer Software, Inc. as well as earlier DAL pacts with Digital

Continued on page 101

NEWSPAPER

Bank bailout costs jobs

Rescuer slashes Bank of New England tech staff

BY MARYFRAN JOHNSON
CW STAFF

PROVIDENCE, R.I. — Nearly 1,000 Operations and Technology Division workers will lose their jobs in a computer systems consolidation between Fleet/Norstar Financial Group and the recently acquired Bank of New England, Fleet officials announced last week.

The consolidation is expected to save Fleet up to $350 million annually by shifting most of the acquired bank's technology operations to Fleet's own data processing and bank operations center in Albany, N.Y., during the next 18 months.

New plans

Fleet plans to close the bank's Boston-based systems and programming office, eliminating 140 jobs, as well as moving the bank's Malden, Mass., data center, which employs 850 people, to the Albany data center.

Fleet began operating the failed Bank of New England operations in Massachusetts, Connecticut and Maine on April 29 under an interim management agreement with the Federal Deposit Insurance Corp. The 3,000 employees in the Operations and Technology Division in the three states will be trimmed to roughly 2,000, Fleet officials said.

The personnel cuts will affect a broad swath of systems

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INSIDE

IBM's Repository Manager has had mixed results among early users in its first year. Page 6.

DEC customers approve of the company's conversion to the 'open systems' philosophy. Page 8.

1-2-3/Windows finally launched as Lotus begins campaign to battle Microsoft as the one-stop applications provider. Page 14.

Product Spotlight — Minicomputers are sometimes the right machines for a server job. Page 63.

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8 Ten companies will be honored by ***Computerworld*** and given Smithsonian Awards for the outstanding ways in which they use information technology to benefit the general public.

10 Looking for privacy: **Microsoft** said last week that it has licensed a data security software package from **RSA Data Security** that would allow PC users to encrypt private messages to be sent across data networks.

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99 **IBM** fits more pieces into its multimedia jigsaw puzzle with the announcement of several products.

100 **Prime**'d and ready: The user group meeting in San Antonio showcases new products and promises of lifelong commitments.

101 Benchmarks get no respect from a lot of people when it comes to OLTP systems purchases.

Quotable

"They will still have a tough sell in non-DEC environments, but I would tell people to listen to their message and see what they have."

STANLEY ROSE
BANKERS TRUST

On DEC's open systems commitment. See story page 8.

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The 5th Wave

"A PORTABLE COMPUTER? YOU'D BETTER TALK TO OLD BOB OVER THERE. HE'S OWNED A PORTABLE LONGER THAN ANYONE HERE."

EXECUTIVE BRIEFING

■ **Minicomputers as servers?** 'Yes,' say 31% of IS managers surveyed by Business Research Group in Newton, Mass. These machines are particularly attractive to people with very large, critical applications and a dire need for service and support as well as to companies that own minicomputers now and would like to extend their use. On the downside, the machines are still expensive, and their resale value is dipping. **Page 63.**

■ **Already tough times** got tougher for 1,000 IS staff members last week when Fleet/Norstar Financial Group announced it is laying off operations and technical personnel as part of its acquisition of the failed Bank of New England. The Providence, R.I.-based financial concern plans to close most of Bank of New England's operations centers and bring their work under Fleet. **Page 1.**

■ **The celebration is muted** as IBM's Repository Manager approaches its first birthday. A sampling of early users finds that although some have made progress with IBM's strategic software development application, many are still quite cool to the concept, and one has stopped development altogether. **Page 6.**

■ **DEC users are confident** the vendor can achieve its goal of becoming a master open systems integrator. But DEC faces problems finding people with the right skills as well as getting its own field sales force to buy into the new strategy. **Page 8.**

■ **Lotus takes the one-stop shopping route,** touting plans to make its interfaces and data consistent across product lines and platforms. The new strategy relies heavily on the success of the Notes groupware application. **Page 14.**

■ **The AT bus lives** inside IBM's PS/2s. The 7-year-old architecture is expected to be at the heart of three desktop systems scheduled to be announced this week, indicating that IBM's bid to move customers to the Micro Channel Architecture is faring poorly. **Page 1.**

■ **A white knight saves Businessland** from bankruptcy, and experts say buyer JWP's strength is in keeping prices low. **Page 4.**

■ **IS professionals** who have had their antennae up in search of a job in broadcasting may want to change channels to where the jobs are: cable television. **Page 85.**

■ **Third-party maintenance vendors** can offer savings of up to 50% on annual contracts for large systems, but IS managers should shop carefully. **Page 93.**

■ **Microsoft is moving to end** incompatibilities between Windows and many graphics boards. The company is releasing tool kits that let developers write drivers that work with nonstandard video equipment. **Page 37.**

■ **A Canadian government agency** will link 12,000 terminals together using an X.25 packet-switching network to connect five networks that barely speak today. **Page 50.**

■ **The state of New Jersey cancels** a processing services contract with **CSC**, saying the vendor isn't performing well. **Page 16.**

■ **Companies with ill-defined software development processes** shouldn't try to justify CASE until they fix those poor processes. The sequence is to standardize, mechanize, then automate. IS departments have been telling that to users for years. Now it must heed its own advice. **Page 75.**

■ **On site this week:** Milwaukee finds network-based purchasing software does the job as well as a mainframe. **Page 47.** Market research firm puts technology in consumers' hands, letting bar-code readers do the work of finding out which cereal is on their shopping lists. **Page 31.** A trucking firm uses imaging to dig itself out of a blizzard of 50 million pieces of paper per year. **Page 31.**

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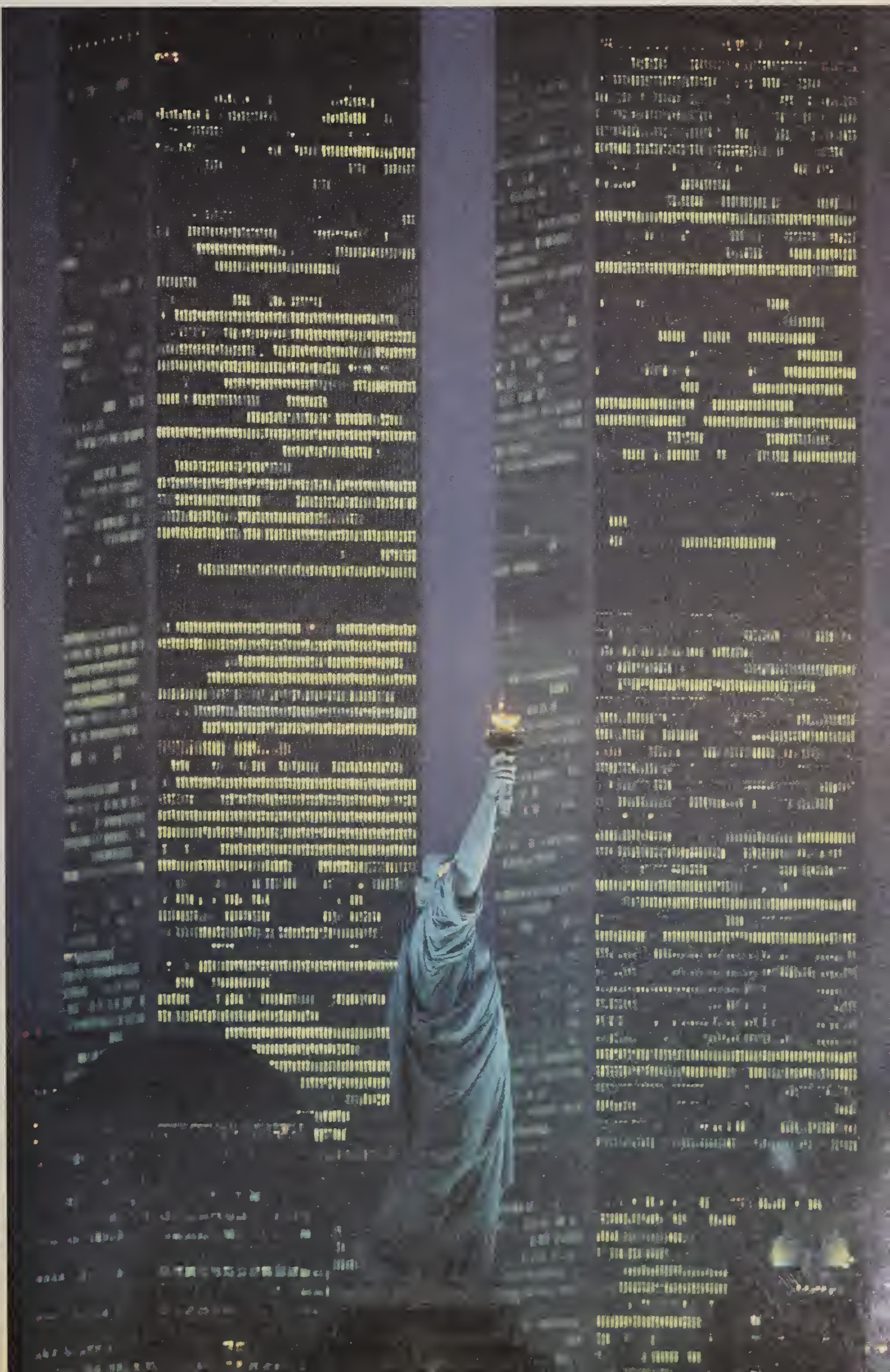


U.S. and Japan sign semiconductor pact

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The U.S. and Japan signed a bilateral trade agreement last week that calls for foreign penetration of the Japanese semiconductor market to rise from its present rate of 13% to 20% by the end of next year. The target carries no penalties if it is not met.

According to the five-year agreement, the U.S. and Japan will no longer collect cost and price data used to detect and monitor dumping. However, the pact provided for a "fast-track" procedure by which Japan will supply such data "on an expedited basis" if a U.S. antidumping investigation is undertaken.

The pact also eliminated sanctions on the import of certain Japanese products imposed on Japan in 1987 for violations of the 1986 U.S./Japan semiconductor trade agreement.

"Computer systems manufacturers applaud the new agreement," said John Young, chief executive officer of Hewlett-Packard Co. and chairman of the Computer Systems Policy Project (CSPP), a coalition of CEOs from 11 major U.S. computer companies. CSPP and the Semiconductor Industry Association (SIA) set aside traditional buyer-supplier differences last fall and made a joint proposal for the new agreement with Japan.

"Japan's public recognition that the foreign share of the Japanese semiconductor market will increase to a minimum of 20% by the end of 1992 is a historic milestone," said Wilf Corrigan, CEO of LSI Logic Corp. and chairman of the SIA.

But it is not the first such milestone. The 1986 agreement was accompanied by a secret letter of understanding containing the same 20% target to be met by July 31, 1991. But the foreign share of Japan's semiconductor market grew from 8.6% in 1986 to only 13.2%, with the U.S. owning a 12.3% share.

Industry groups generally praised the agreement, but some on Capitol Hill were less pleased.

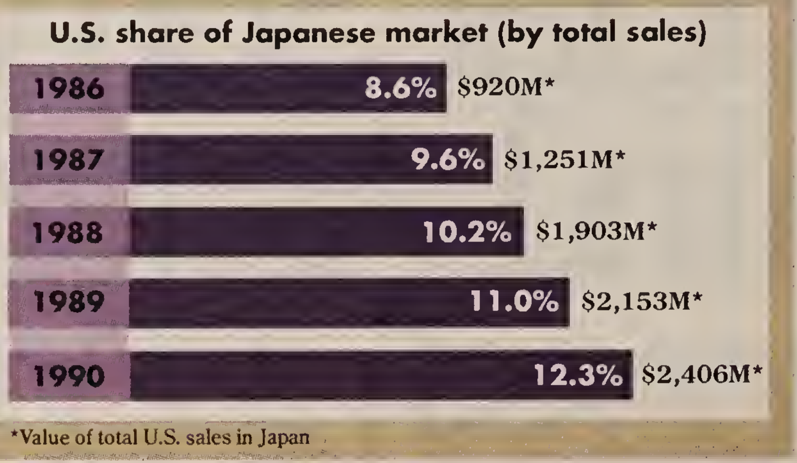
"The agreement contains no specific commitments by Japan to guarantee market share opportunities for U.S. semiconductor producers . . . I don't see why we should reward Japan for failing to live up to an agreement they've already signed," House Majority Leader Richard Gephardt (D-Mo.) said.

The agreement should prevent dumping while further opening the Japanese market, said Sen. Max Baucus (D-Mont.), chairman of an international trade subcommittee. But he added that the trade sanctions should not have been lifted. "The commitments have still not been met," he said.

The pact may be terminated after three years by mutual agreement.

Counting the chips

U.S. semiconductor manufacturers have slowly increased penetration of the Japanese market



*Value of total U.S. sales in Japan

Source: World Semiconductor Trade Statistics, Inc.

CW Chart: Doreen St. John

Faltering Businessland finds savior in JWP merger offer

BY RICHARD PASTORE
CW STAFF

PURCHASE, N.Y. — Businessland, Inc., which seemed headed for the brink last month after reporting a shocking $43 million quarterly loss, has been tossed a lifeline by JWP, Inc. The technical services company offered to merge the $1.3 billion computer dealer with its current $843 million reseller operation to create the U.S.' largest wholly owned personal computer dealership.

JWP, which started out 14 years ago as an investor-owned water utility, has since diversified into computer sales and distribution, systems integration and mechanical and electrical services. The firm logged close to $3 billion in sales last year.

In 1990, JWP purchased PC dealer Neeco, Inc. to fill out its Computer Systems Group PC dealer operation. That group plies a Fortune 1,000 clientele exclusively with an outbound sales force.

As a dealer organization, JWP is noted among industry analysts for its efficient hardware order and delivery system, something that should benefit Businessland customers. Despite numerous attempts to reorganize its distribution and trim overhead, Businessland continues to have problems with delivery efficiency.

Businessland's troubles have prompted several customers to jump ship. "The level of service deteriorated toward the end of last year, so we signed our 1991 supplier contract over to Nynex Business Systems," said a large corporation's network manager, who preferred anonymity.

It remains to be seen whether JWP can stem the tide of defections or lure back the disaffected accounts. However, the firm's short but highly effective track record running Neeco speaks well for it, said Doug Kass, an analyst at Dataquest, Inc. in San Jose, Calif.

Businessland's largest customer, Eastman Kodak Co., is relieved by JWP's offer. "It's a positive development in contiuing our long-term relationship with Businessland," said Leon Griggs, director of PC services at Kodak.

JWP's low-cost delivery system should allow it to continue offering the low prices Businessland buyers are accustomed to while adding the solid backing and consistent service Businessland has failed to provide, analysts said.

Pending approval of the merger, JWP spokesmen would not comment on particulars of integrating Businessland into the operation. However, analysts speculated that Businessland's management will not be retained. Businessland has not earned a net profit since the third calendar quarter of 1989. It has lost more than $90 million in that time.

Apple eyes chip defection

BY PATRICIA KEEFE
and JAMES DALY
CW STAFF

A history of late deliveries, most recently with the 68040 from chip supplier Motorola, Inc., has Apple Computer, Inc. rethinking its commitment to Motorola's 88000 RISC chip.

If Apple were to defect to another supplier of reduced instruction set computing (RISC) processors, it would pose a serious blow to Motorola's semiconductor business, analysts said.

An Apple spokeswoman confirmed that the company is talking to multiple RISC suppliers but would not confirm or deny a published report last Friday about a pending deal for IBM's RISC chip set in exchange for Apple software.

An IBM spokeswoman said IBM has never ruled out licensing its proprietary RISC chip set, which sits at the heart of the RISC System/6000 line.

Analysts speculated that Apple may be pressuring Motorola to ensure a prompt delivery of its RISC chips. A dissenting view came from Lotus Development Corp. Vice President Don Casey, who said, "When I was at Apple, I never felt we lacked for Motorola's attention. Doing this [pressuring Motorola] in public doesn't strike me as consistent with Apple [policy]."

Other observers seemed to think that a software licensing arrangement between IBM and Apple was more likely.

Analysts said that IBM might want to integrate pieces of the Apple operating system into OS/2 in exchange for assisting Apple in resolving more advanced IBM connectivity issues as well as providing technology such as IBM's Advanced Peer-to-Peer Networking.

Apple's product delivery plans for a 68040-based Macintosh were set back when Motorola was six to 12 months late delivering the chip, said Tim Bajarin, an analyst at Creative Strategies Research International, Inc.

CORRECTIONS

Because of a reporting error, a Comdex/Spring '91 notebook item that referred to a spreadsheet panel discussion incorrectly identified the speaker from Borland International, Inc. Steve Kahn, not Philippe Kahn, represented Borland.

…………

Richard Goldberg, IBM's assistant general manager of software marketing, was incorrectly identified as Robert Goldberg in the June 3, 1991, issue.

…………

TGV, Inc., maker of a Transmission Control Protocol/Internet Protocol-to-VAX/VMS connectivity application called Multinet, will give full credit to those who bought Novell, Inc.'s OEM version of the product. TGV, and not Novell, sells and supports all versions of Multinet.

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NEWS SHORTS

IS management bonuses slashed

Information systems executives have seen their bonuses slashed an average of 23% because of the recession, according to a 1991 survey by Edward Perlin Associates, Inc., a New York compensation consulting firm. The survey of 800 IS managers at 31 major corporations found an average increase of 7% in base pay compared with last year's survey and an average drop of roughly 1% in total compensation. Companies have been shifting financial incentives to bonuses, which can be cut in hard times and still enable the company to keep salaries competitive, the firm reported.

……

Slate schedules shipment

Slate Corp. sketched out plans to expand its pen-based computing packages last week with support for Microsoft Corp.'s upcoming Windows for Pens operating system, which is expected late this year. Slate's first Microsoft offering will be the Penapps development environment, a product it now produces for Go Corp.'s Penpoint system. Chairman Vern Rabun expects the company's Microsoft-based Penapps to be available by the second quarter of 1992. A development environment version of Penapps will cost $2,500, while a runtime edition will sell for $99. The Scottsdale, Arizona-based Slate also plans to up its linking capabilities and begin to produce Penpoint products using Traveling Software's communications technology.

……

AT&T opens up Accumaster

At last week's International Communications Association conference in Anaheim, Calif., AT&T said it will publish its Accumaster Integrator alarm interface and support documentation for AT&T's Simple Network Management Protocol. The company said opening Accumaster's network management interface would bring the product closer to compliance with OSI standards by allowing developers to write Open Systems Interconnect (OSI) and non-OSI software for management applications.

……

Bells get Senate support

The U.S. Senate voted 71 to 24 to allow the seven regional Bell telephone companies to manufacture communications equipment, a $115 billion line of business prohibited by the Consent Decree that broke up AT&T in 1984. The Baby Bells are expected to find more resistance when the U.S. House of Representatives takes up a similar bill. President Bush threatened to veto the bill if it retains a provision limiting the foreign content of the equipment. The Bell companies also may not sell information services or long-distance services.

……

NSA publishes specs for DBMSs

The National Computer Security Center, a unit of the National Security Agency, has published the Trusted Database Management System Interpretation (TDI) of the Trusted Computer System Evaluation Criteria, the so-called "Orange Book" detailing specifications for trusted operating systems. The TDI extends the concepts of trusted systems to applications in general and to DBMSs in particular. The center said it has so far received six technical proposals for trusted DBMSs for evaluation and certification at various levels of security.

……

Xerox adds imaging system

Xerox Imaging Systems last week announced a new high-speed document imaging system offering a 30% increase in throughput over its earlier products for personal computers. At the heart of the K6200 document input system is a reduced instruction set computing (RISC) processing unit featuring the AM29000 RISC chip from Advanced Micro Devices, Inc. The system also includes proprietary intelligent character recognition software and a high-speed, heavy-duty scanner with an automatic document feeder. Following numerous other imaging vendors, Xerox choose Microsoft's Windows 3.0 environment as the end-user interface for the K6200, which will be available at the end of June at a price of $25,950.

More news shorts on page 100

Repository users slow to start

After a year, AD/Cycle hub draws mixed messages from early installers

BY ROSEMARY HAMILTON
CW STAFF

Nearly one year after its release, IBM's Repository Manager has yet to catch the fancy of many users.

It has had mixed results at early-user sites, with at least two customers in a small group of early users reporting progress but with another putting Repository Manager on hold because it was too difficult to work with. Some other users contacted last week said they are still not ready to embrace the concept, much less install the software.

"We looked at the general concept and approach and didn't feel it was going to be immediately beneficial to us," said Doug Underhill, a vice president at CSX Technology, the information systems arm of CSX Corp. "I also have to confess that I am still confused by what it is."

Piece of the puzzle

Repository Manager is a key piece of IBM's AD/Cycle, its software development strategy. The software, which is essentially an application that sits on DB2, is designed to act as the central storage and control mechanism of a computer-aided software engineering (CASE) environment.

IBM shipped an initial version of Repository Manager/MVS in June 1990. It has maintained that this release is not a full-blown repository and as such is intended for other vendors and advanced users.

"I think the level of interest could be stronger," said Paul Hessinger, chief technology officer at the Computer Task Group. "IBM continues to say this release was for the tools builders, but the interest should be stronger in terms of planning for it, planning for it generically as well as planning for Repository Manager."

An IBM spokesman last week said developments in both AD/Cycle and Repository Manager are an evolutionary process. "If customers are satisfied with the progress they are making, then so are we," he said. "If they are not, then we've got more work to do."

Two early users contacted last week gave this release good marks. However, a third, Depository Trust Co., which installed Repository Manager before it was officially released, stopped working with it early this year.

"We aren't ready for it, and we aren't sure it's ready for us," said Emmanuel Ackerman, director of data administration at the firm.

Ackerman's staff tested the software for several months, he said, "but we haven't done anything since the first of the year."

Still, both the Bank of Montreal and Phillips Petroleum Co., also early-user sites, report more positive experiences.

"We have been well-supported by IBM, and we've done some of our tool building, and we have decided that to the extent that it was painful, it was worth the pain," said John Meadows, a senior vice president at Bank of Montreal.

Moving along

The bank is likely one of the more advanced shops. Meadows said his staff has been moving data in and out of the repository with their own tools. Other sites, including Phillips Petroleum Co., have spent most of their time testing and studying the software.

"We've used this time to learn what we can do with it," said R. W. Hankinson, manager of client applications and technology services.

"We've been able to communicate our needs back to IBM as to what they need to develop and what kinds of interfacing [the third parties] need to do," Hankinson added.

Other users do not expect to be at this stage for a few more years. "I don't even have a position on it," said James Stuber, a first vice president at Mellon Bank. "We just haven't looked at it recently. We are concentrating on more immediate things, like CASE tools and building DB2 applications."

Observers skeptical of Intel's I860

BY JIM NASH
CW STAFF

SANTA CLARA, Calif. — With the introduction of Intel Corp.'s new I860 XP microprocessor, the company has proved it can surf with the best on the reduced instruction set computing (RISC) wave.

But observers said Intel has grabbed the wave too late and too close to shore. Few computer makers use the I860 in their workstations or mainframes.

Those that do use it cater primarily to niche needs centering on complex graphical displays. Observers predicted that the XP will have little impact on the majority of information systems departments requiring RISC systems.

The company, based here, last week announced preproduction shipment of the XP, a 2.5 million-transistor chip capable of 100 million floating-point operations per second. Intel is offering 40- and 50-MHz versions of the XP for use as CPUs in supercomputers and as accelerator boards in workstations.

The XP, Intel executives said, will be followed by a 60-MHz version now under development. It was preceded in 1989 by the one million-transistor, 33-MHz XR. Though considered different generations, both are RISC chips. Also last week, Intel announced availability of a scaled-down XR running at 25 MHz and costing $176 each in sets of 1,000.

An Intel spokesman said he expects to see systems running on the chip in "six to nine months."

Gordon Bell, chief scientist at Stardent Computer, Inc. in Sunnyvale, Calif., said his company will have an XP-based machine out this summer. No other computer vendor using an I860 chip would be so specific.

Michael Slater, editor and publisher of "The Microprocessor Report" in Sebastapol, Calif., said the entire line of I860 chips was handicapped early on by Intel's late arrival into the RISC architecture arena. Slater said by the time Intel introduced the XR two years ago, most computer hardware makers had already standardized on microprocessors by IBM, Hewlett-Packard Co., Mips Computer Systems, Inc. and Sun Microsystems, Inc.

By Intel's own reckoning, 60% to 70% of the market belongs to entrenched competitors. The company instead will focus on a handful of primary computer vendors including Stardent Computer, Alliant Computer Systems Corp., Oki Electric Industry Co. Ltd., Samsung Electronics Co. and its own supercomputer division.

The XP, which will cost $699 for the 50-MHz version and $560 for the 40-MHz version, is likely to be a "very good companion product to the X86 line," said analyst Millard Phelps at Montgomery Securities in San Francisco. But its role remains primarily that of an accessory, Phelps said.

"As a coprocessor, you can unload [data] and it will crank away," he said.

Oracle

CONTINUED FROM PAGE 1

Washington, D.C., area. "They needed cash, and they had to give away 49% of Oracle Japan to get it." Oracle said it will maintain 51% ownership of the Japanese business — which is expected to generate more than 10% of its revenue by 1995 — and has an option to increase its share.

The issue of financial stability seemed to outweigh any prospect of Oracle opening the door to future foreign control.

"At least this isn't another American software company trying to take Oracle over," said Tony Ziemba, chairman of the New York Oracle Users Group. "We just want to know that our vendor will be there for us and that their revenue stream will allow them to continue their product development plans and to improve customer service."

Cash flow dried up

Oracle's cash flow had trickled to a virtual halt earlier this year. Oracle executives said in January that the $971 million firm then had less than $50 million cash on hand and that more than $300 million in back payments from customers had to be collected.

During its third fiscal quarter, Oracle decided to write off $42 million of those bills as uncollectible. However, positive cash flow returned that quarter, and by March, Oracle had $72 million in cash.

As part of the Oracle Japan pact, Nippon Steel will gain $100 million worth of Oracle preferred stock, convertible in four years to Oracle common stock, and is guaranteed a 6% return on that money. It also owns $100 million in 10-year convertible notes, which will produce a guaranteed 9% interest.

For the moment, however, Oracle's stock — which slid from $28 per share to $6 per share on news of a $36 million loss for the first quarter last fall — will remain undiluted until 1995. Oracle stock is now trading at about $10.

Analysts said Oracle will use the Nippon Steel money to reduce Oracle's $168 million line of credit with an international syndicate of 13 banks. The banks have been growing impatient since Oracle failed to meet its loan covenants in February because of insufficient profits.

The lingering debt situation left one Oracle customer wary about the lasting impact of last week's deal. "They're just moving the debt around and making it more manageable," said the California Oracle user, who did not wish to be identified.

Resignation announced

In another development last week, Oracle announced the resignation of former Chief Financial Officer Jeffrey Walker.

In March, Walker was reassigned to direct Oracle's Applications Division, a group he had started in 1988. "It's a positive thing, from Wall Street's point of view," said Charles Phillips, a senior analyst at Soundview Financial Group, Inc. in Stamford, Conn. "But his resignation is not as important as the fact that he was replaced as CFO." Walker will serve as a consultant to Oracle, the firm said.

Walker's departure came May 31 but was only announced last Tuesday. Oracle has since named George Koch, 44, a longtime associate of Oracle Chief Executive Officer Lawrence Ellison, as senior vice president and director of the Applications Division. Koch, whose banking applications firm, Koch Systems, Inc., became one of Oracle's first value-added resellers in the 1980s, will also serve on Oracle's management committee.

"Even though Koch is an outsider," Ziemba said, "he's got that personal relationship with Ellison that will make him an effective player inside Oracle."

Trendsetter

Oracle's deal with Nippon Steel is just the latest example of a growing trend toward Japanese investment in U.S. relational database management system firms.

Tokyo-based Nippon Steel already has a large systems integration business with 3,000 employees in Japan. The firm has the ability to use Oracle products in its turnkey solutions for Japanese customers and to distribute Oracle products throughout Japan, analysts said. Nippon Steel also owns Librex, Inc., a 1-year-old San Jose, Calif., firm that makes laptop computers.

Last year, Ascii Corp. in Japan bought 5% of Menlo Park, Calif.-based Informix Software, Inc., which has a large share of the Unix RDBMS market. In 1989, Informix had made an investment in Ascii, in part to help Informix distribute software in the Japanese domestic market.

In November 1990, Sumitomo Metal Industries Ltd. in Tokyo joined in a three-way business venture with Unify Corp. in Sacramento, Calif., and Air Co., a Japanese firm that distributes Unify's software in Japan. Air set up a value-added reseller network within Japan that sold applications developed with Unify's Accell/SQL fourth-generation language. Unify also sells an RDBMS engine for use with Unix systems.

JEAN S. BOZMAN

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DEC converts to open systems

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Acknowledging that proprietary systems are a bitter pill that users hesitate to swallow, Digital Equipment Corp. last week declared its corporate conversion to open systems, leaving many customers and industry analysts nodding in approval.

"The big thing DEC has to do now is convince people of what they've been doing all along with their strategy to tie together heterogeneous platforms," said Stanley Rose, vice president of technical strategic planning at Bankers Trust Co. in New York.

"They will still have a tough sell in non-DEC environments," Rose added, "but I would tell people to listen to their message and see what they have."

Along with its "Open Advantage" marketing campaign, DEC unveiled 30 networking (see story at right) and software products last week, including a few that run on the Sun Microsystems, Inc. platform and several more that run under MS-DOS, Microsoft Corp.'s Windows 3.0 and Apple Computer, Inc.'s Macintosh.

"I think DEC is working very hard to give us a migration strategy so we don't get caught," said Ken Krallman, manager of information systems at Carleton Technologies, Inc., an aerospace manufacturer in Orchard Park, N.Y. Formerly an all-VMS shop, Carleton is expecting its first Unix-based Decstation 5000 next week.

DEC's Open Advantage campaign will stress a broader definition of openness, meaning a standards-based, plug-and-play network into which any vendor's hardware can be inserted for the best fit with any application.

"In a sense, DEC is moving the debate on open systems to a higher level," said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass. "Users are more interested in where their applications can run on the network than in which variant of Unix a vendor supports."

Overall, DEC customers seem confident that DEC can deliver on its promises.

> "I THINK DEC is working very hard to give us a migration strategy so we don't get caught."
>
> KEN KRALLMAN
> CARLETON TECHNOLOGIES

"DEC has shown us they are moving as aggressively as they can into open systems while maintaining their installed base," said Ingvar Petursson, vice president and chief information officer at McCaw Cellular Communications, Inc. in Kirkland, Wash.

"We are adopting the philosophy DEC is talking about, and they seem strongly on the path to an open philosophy of interconnecting systems," said Robert Grandle, a systems manager at the National Aeronautics and Space Administration's Langley Research Center in Hampton, Va., which uses a Unix-based network with systems from IBM, DEC, Hewlett-Packard Co. and Sun.

Yet users and analysts agreed that DEC faces daunting business and technological challenges over the next two years.

The VAX line is being re-engineered from a complex one to a reduced instruction set computing-based CPU, and the proprietary VMS operating system is being "opened" with the addition of Posix-compliant industry-standard interfaces.

In the meantime, layoffs are trimming company size from 125,000 to roughly 116,000 by the end of this year, while company executives claimed that people-intensive areas such as services and systems integration will become the key money makers.

"There's not that many people around with all the skills needed for systems and network integration," Krallman noted.

A key issue in DEC's success with this new strategy will be communicating it to thousands of sales representatives in the field, analysts and users said.

"Out in the field, the salespeople are very strong in their conviction that this move to open systems isn't happening," said John Braucksieker, MIS director at Protein Technologies, a subsidiary of St. Louis-based Ralston Purina Co.

"DEC had better start educating its employees in these new philosophies," Braucksieker said.

Clear, open advantage

DEC's Open Advantage campaign features a strong networking bent, with several key products and capabilities falling under its Network Applications Support (NAS) program. NAS is a set of programming interfaces, tool kits and software products that allow users to integrate and distribute applications across VMS, Unix, MS-DOS, OS/2, Sun and Apple Macintosh platforms.

Following are highlights of last week's announcements:

- The extension of NAS to provide transaction processing software for MS-DOS and Macintosh desktops and the addition of new capabilities to DEC's Compound Document Architecture for Macintoshes and MS-DOS personal computers.
- Delivery of NAS products for multivendor platforms.
- The intent to extend DEC's Enterprise Management Architecture products into the NAS products, eventually providing "common agent" software that will allow access to various managed resources, such as applications and databases.
- The rollout of multiprotocol routers, available immediately, that support Decnet, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect protocols and a frame-relay interface.
- A shipping date of August 1991 for network adapter cards supporting Fiber Distributed Data Interface's 100M bit/sec. data rates on shielded twisted-pair wiring or DEC's thin-wire copper cabling.
- A joint development and marketing partnership with Bell Atlantic Software Systems for software that ties The Santa Cruz Operation's Unix and AT&T Unix System V Release 3 and 4 into Decnet sites.
- A resale agreement with OSI software maker Retix Corp. that allows DEC to market Retix's X.400 Open Server for linking disparate local-area networking electronic mail systems.
- Plans to beta-test this fall the Network Integration Server 600, which amalgamates bridge, router and X.25 switch functions in one box.

Smithsonian Awards for outstanding technology use

WASHINGTON, D.C. — Ten winners selected from a field of more than 270 entrants will be honored here tonight at the third annual *Computerworld* Smithsonian Awards. The awards recognize outstanding uses of information technology that benefit the general public.

A field of 50 finalists had been chosen in the categories of business, education, manufacturing, environment, finance, government, media, medicine, science and transportation.

Judging was done by experts from government, business and academia in each of the 10 categories. The winners will be included in a permanent exhibit at the Smithsonian Institution.

Previous winners have included Sierra/Misco, Inc., which developed an early flood warning system; LC Technologies, Inc., developer of a computer that allows disabled people to type; and the Jason Project, which beams live underwater exploration pictures into classrooms around the country.

The ceremony will be held at the National Building Museum.

Phase V tweaks Decnet OSI strategy

BY JOANIE M. WEXLER
CW STAFF

MAYNARD, Mass. — In the aftermath of Digital Equipment Corp.'s "open" computing announcement avalanche last week, users were upbeat but not euphoric about the tardy arrival of the company's Decnet Phase V for Ultrix and VAX/VMS.

The Phase V arrival includes an Ultrix version of the communications protocols scheduled for rollout this month, and VAX/VMS/OSI hooks, expected to ship in August.

The VMS product is a precursor to full-blown Phase V for VMS, slated to hit the streets in early 1992.

Decnet Phase V — now renamed "Advantage-Networks" — modifies DEC's Decnet Phase IV suite of proprietary communications protocols by swapping in OSI protocols at the bottom four communications layers of the OSI reference model.

Those layers, or networking tasks, specify standard rules that tell devices how to physically connect and access a medium, what type of cabling to use and how to transfer and route data.

A surprise in the Phase V/Ultrix announcement was the bundling of the widespread Transmission Control Protocol/Internet Protocol (TCP/IP) into the same processor as OSI.

"Companies with a need for open networks have already implemented TCP/IP, and no way are they going to rip those out and put in OSI," said Janet L. Hyland, director of network strategy research at Forrester Research, Inc. in Cambridge, Mass.

Not in any big hurry

Users said they have not been wringing their hands waiting for Decnet Phase V, despite the criticism DEC has received for missing its original September 1990 rollout deadline.

They explained that there have not been enough OSI products available from other vendors to fuel the need for OSI interoperability with DEC equipment.

"When you have multivendor networks with thousands of nodes, nothing accommodates them except OSI," said Sholom Bryski, manager of distributed systems and networks at Bankers Trust Co. in New York. However, "Until now, we weren't approaching that situation," he added.

The goal behind the seven-layer OSI model is to provide one universal set of networking rules that allow all vendors' equipment to intercommunicate.

"I haven't been sitting around waiting for OSI, but I will definitely use it," said Ray Parcell, computer operations specialist at Naval Mine Warfare Engineering Activity in Yorktown, Va.

While Parcell's organization is not under Government Open Systems Interconnect Profile (GOSIP) pressure to specify OSI-capable equipment in new procurements — a federal mandate that kicked in last August — he said it is being absorbed by a federal agency on the West Coast that requires GOSIP compliance.

"Phase V will help us because we have a supercomputer procurement in progress, and you don't go talking to supercomputers via Decnet," added David A. Bittenbender, telecommunications chief at the U.S. Environmental Protection Agency in Research Triangle Park, N.C.

As part of the Phase V rollout, DEC announced File Transfer, Access and Management (FTAM) for Decnet/OSI for Ultrix, as well as a gateway to link FTAM and TCP/IP's File Transfer Protocol (FTP).

FTAM and FTP are counterpart application utilities in the OSI and TCP/IP worlds that allow transparent access to files on a network regardless of the particular host operating system or file format.

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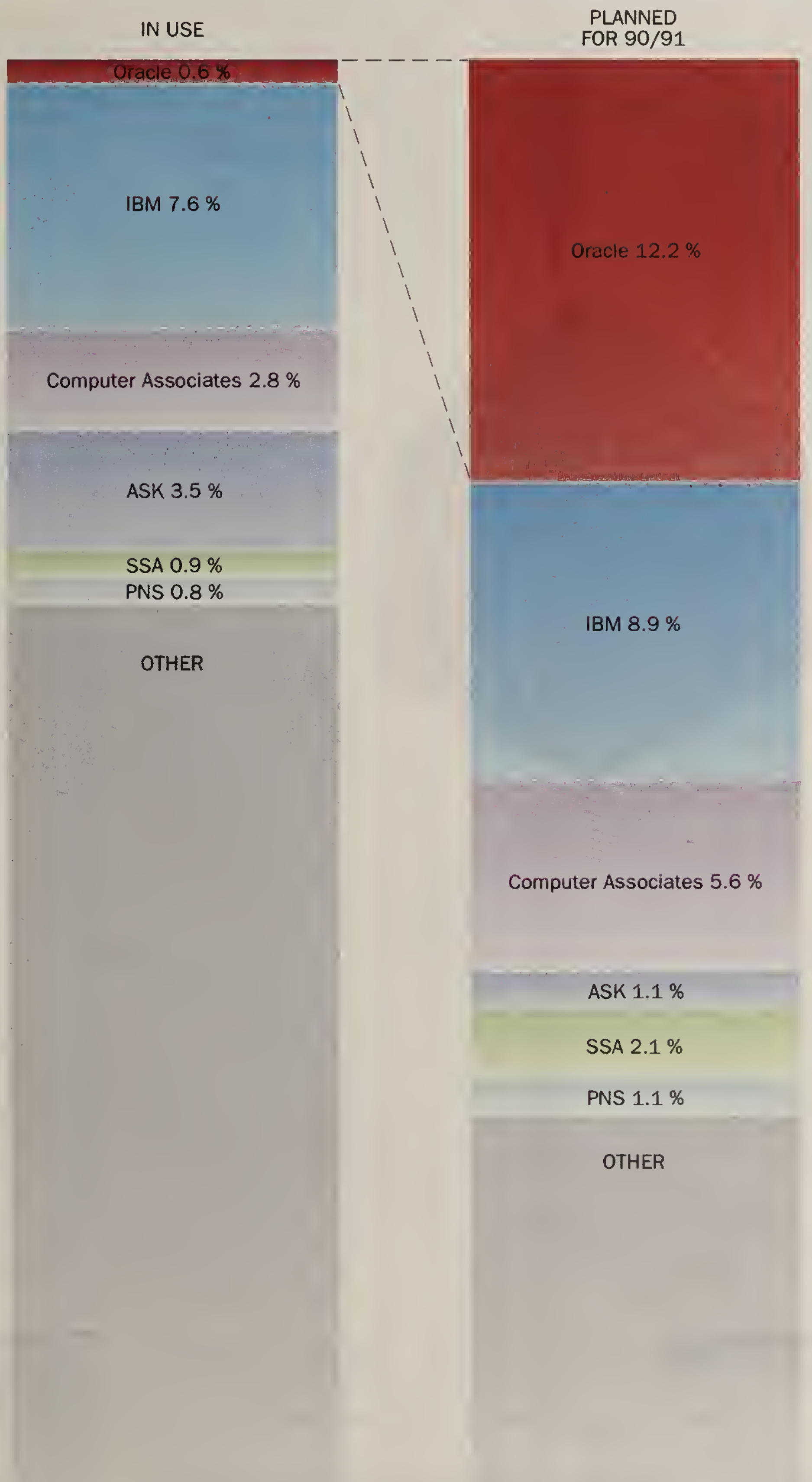

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IBM automates CICS management

BY ELISABETH HORWITT
CW STAFF

RYE, N.Y. — IBM last week introduced automated software designed to take much of the grunt work out of managing and maintaining an enterprise network of IBM CICS.

CICS Automation Option/MVS works with IBM's Netview network management platform on each CICS host to respond automatically to a range of alerts and events across the network and to minimize the need for a human technician at each site, according to IBM staff programmer Evelyn Treuil.

In addition, the system provides the network manager with the ability to control and monitor an enterprise network of multiple CICS regions from a single console, Treuil said.

One of the package's key features is a monitoring component that keeps an eye on the LU6.1 and LU6.2 links that support CICS sessions, according to IBM spokesman Mack Phelps. The monitor attempts to reacquire a session when a link goes down and notifies IBM's Automated Console Operations software if the attempt fails, he added.

The program can also automatically reacquire links that were cut off as the result of a Network Control Program failure, Phelps said.

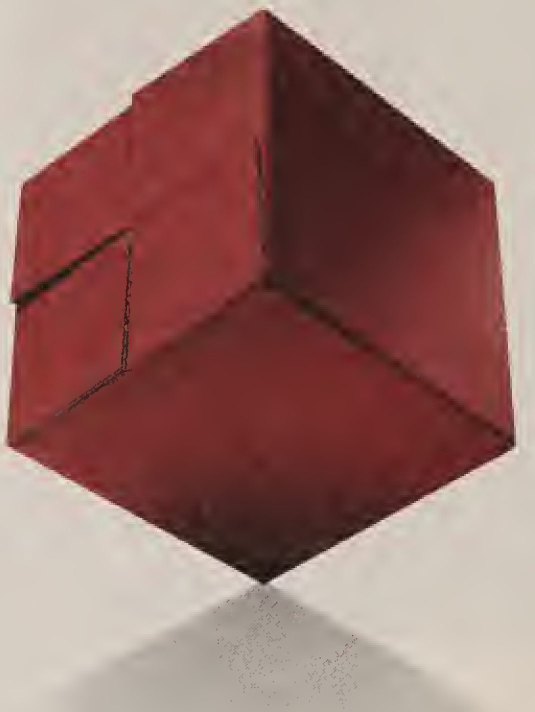
Other key features include the following:

- Operator notification when "abends," or abnormal terminations of programs, within CICS exceed a preset threshold. The software can also be programmed to ignore certain types of failures, such as those resulting from the failure of an individual terminal.
- The ability to monitor and resolve problems with Inter-System Communications and Inter-Region Communications links between CICS.

The new CICS software works with IBM's Automated Network Operations/MVS, an enhanced version of its Solutionpac Netview Automated Network Operations software, which IBM officially released last month. It is said to provide significant performance improvements over IBM's existing Solutionpac software.

CICS Automation Operation/MVS also provides a dynamic, color-coded graphic depiction of the changing status of VTAM network components, IBM said.

Priced at $18,400 for the basic system, the program is available now.



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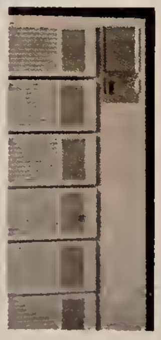

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SYSTEMS

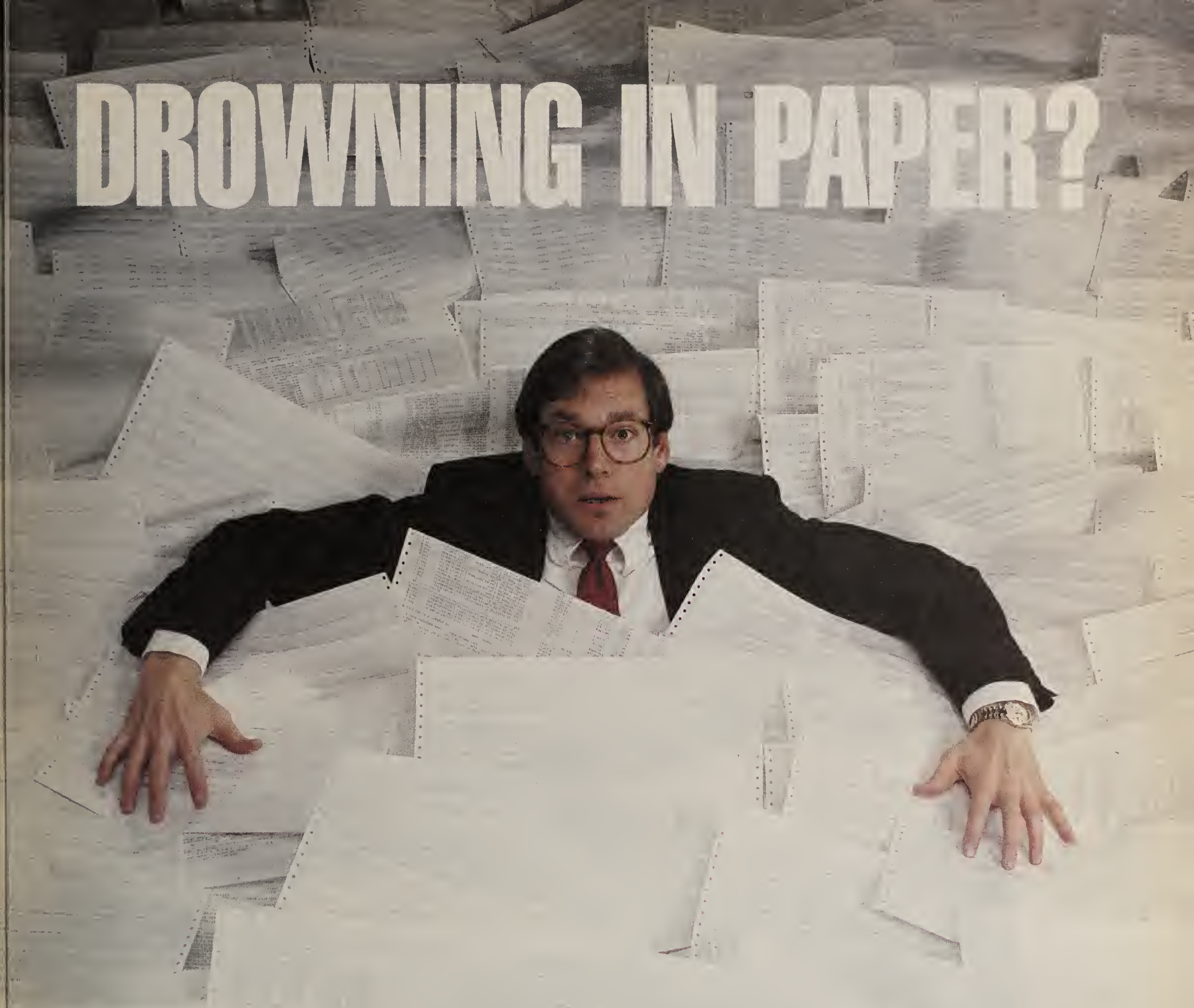
Microsoft to add security

REDWOOD CITY, Calif. — Microsoft Corp. said last week that it has licensed a data security software package from RSA Data Security, Inc. that will allow personal computer users to encrypt messages to be sent across data networks.

Microsoft Chief Executive Officer Bill Gates said the license will be used to create future PC software products. Eventually, the code will be "pulled" into the Microsoft operating system, he said.

"People's assumptions about physical access [to a data network] and about having a single person control that access no longer apply," Gates said. "In the very large networks of the future, information will come from many sources and from many networks, and you'll have to worry about who's tapped in and who's watching those data packets go by."

RSA's system works by issuing users a public key, or very long number, that is widely distributed around a network and a private key, or a set of two long numbers. The key system allows businesses to verify the identity of any sender of electronic information. Without it, Gates said, "someone else could masquerade as Bill Gates at Microsoft and give out memos purporting to come from me."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Lotus faces off with Microsoft

Work-group applications key to one-stop shopping title

BY PATRICIA KEEFE
CW STAFF

BOSTON — Lotus Development Corp. took advantage of its annual meeting to up the ante in its race with Microsoft Corp. to become the one-stop work-group provider to corporate accounts.

Lotus executives told attendees at last week's meeting that it is moving to better exploit graphical interfaces, to ensure similarity of operation between its packages and to incorporate groupware hooks to better tie together those programs through Notes.

Lotus has taken the first step down this path by building a suite of Windows applications that feature identical icons for the same commands. Last week, the firm formally announced 1-2-3 for Windows, which is scheduled to ship this summer at a price of $595.

Lotus also said it would not shut third parties and developers out of its plans. However, certain features, such as Smart Icons — user-definable, user-customizable what-you-see-is-what-you-get buttons for certain functions — will not be made available, a spokeswoman said.

The theme "Working together," which translates to consistency and integration among applications, was carried through presentations by company executives, including Frank King, senior vice president of the Lotus Software Business Group.

Lotus' effort takes its lead from the Windows 3.0 environment, which is supposed to provide a common look and feel across applications. Lotus is expanding on that concept by taking it a level lower into the application. King summed up Lotus' strategy as ensuring consistent appearance (color, fonts, menu bar, screen layout and icons), behavior (print, file open, Help, color, font selection and common user objects) and compatibility.

"User interface consistency beyond the conventions defined by the operating environment will [become] vital as users switch between information types in creating and exploring compound documents," King said, adding that Lotus will re-engineer applications to achieve this.

That approach won early praise from users. "We are judging applications by how well they function within a family of applications and how vendors' applications are internally consistent with one another," said Ronan McGrath, vice president at Canadian National Railways in Montreal.

Also key is that many users do not need more base functionality, said Sheldon Laube, director of technology at Price Waterhouse in New York. They need better integration among packages to ease work-group communication.

For example, by building hooks into Notes and its automatically replicating database, Lotus will enable Laube to simplify and shorten the process by which he sends a worksheet to another user.

In addition, Lotus gave signs that Microsoft Office's bundle of four Windows applications will not go unchallenged. King said that while Lotus was not making any public statements, it is entertaining a variety of licensing requests from users' accounts.

Token Ring card price hacked 50%

BY JOANIE M. WEXLER
CW STAFF

WHITE PLAINS, N.Y. — IBM lashed out at the Ethernet market last week by slashing its 4M bit/sec. Token Ring network adapter card prices by 50%.

Users and analysts said the move will probably spur users whose purchasing decisions hinge on price to choose the Token Ring alternative for medium-size local-area networks that exchange enough traffic to bog down an Ethernet.

The performance of Ethernet can drop even lower than Token Ring's 4M bit/sec. on a heavily loaded network because of the haphazard network access method it uses.

"Token Ring's token-passing access method is immune to that, and Token Rings are easier to manage," said Bill Sheehan, network support specialist at Stone & Webster Engineering Corp. in Boston.

IBM marked down its cards, which attach Micro Channel Architecture and AT bus computers to a 4M bit/sec. Token Ring LAN, to $395 from $700 to $800.

IBM was able to drop prices because "we've refined our processes over the last five or six years and are passing along our savings to our customers," said Bill Spencer, IBM's product planner of LANs. IBM also dropped the price of its 4/16M bit/sec. card from $957 to $895.

IBM competitors Proteon, Inc. and Madge Networks, Inc. have not indicated that a price war is afoot.

"Given the [positive] direction of 4/16M bit/sec. Token Ring, there hasn't been much activity in the 4M area," said Charlie Robbins, director of communications research at Aberdeen Group in Boston. "Dropping the price is a way of giving it a midlife kick."

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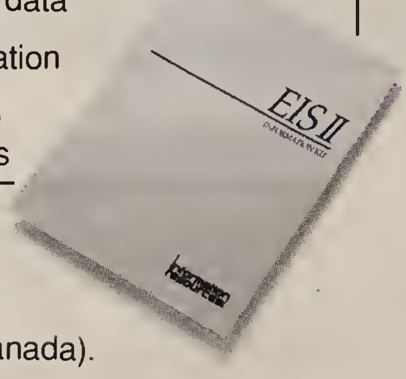

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**David W. DeLong, co-author of "Executive Support Systems: The Emergence of Top Management Computer Use."*
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Gupta on end-user Quest for SQL link

BY JEAN S. BOZMAN
CW STAFF

BURLINGAME, Calif. — Gupta Technologies, Inc. announced an end-user database query tool last week that supports Microsoft Corp.'s Windows 3.0 graphical user interface and allows corporate end users to create their own database reports without information systems help.

The $495 product, called Quest, was designed as a companion to Gupta's SQLwindows query tool for software developers. Quest can be used to obtain data from IBM's DB2 and Oracle Corp.'s Version 6.0 RDBMS as well as Microsoft's SQLserver for OS/2 and IBM's OS/2 Extended Edition Database Manager.

Connectivity software for mainframes and minicomputers could significantly boost the cost of ownership. The Gupta host-based software for IBM's DB2, for example, will cost users $40,000 to $100,000. SQLgateway, another Gupta product required for use with DB2, is priced at $3,500. A similar gateway for Oracle host databases is also priced at $3,500.

Quest can also share data with any Windows 3.0 applications program running Microsoft's Dynamic Data Exchange facility. In this way, Quest could obtain data from DB2 and "paste" it into a Microsoft Excel spreadsheet.

However, system security and database integrity are matters that Gupta will leave up to IS and database administrators. "It is fair to say that Quest is a data access tool and not an information management tool," company founder Umang Gupta said. "We assume that security privileges and data are maintained by somebody at the back end [database server]."

Industry analysts present at the Quest demonstration here were upbeat about the product's capabilities. "With all the competition in the relational database market, they have placed less emphasis on their SQLbase database and more emphasis on their tools," said Donald Feinberg, program director at Gartner Group, Inc.'s Software Management Strategies service in Santa Clara, Calif. At the same time, he said, the market has a relative lack of graphically oriented database tools for end users — something that has slowed general acceptance of local-area network database servers.

However, Quest may have an uphill marketing fight, with some analysts questioning whether Gupta, with only about $15 million in revenue, can have an impact on the vast LAN marketplace.

N.J. agency axes CSC pact

BY JOHANNA AMBROSIO
CW STAFF

TRENTON, N.J. — The state of New Jersey said last week that it will cancel the remainder of an insurance services contract with Computer Sciences Corp. (CSC), citing a shrinking amount of business and performance problems.

The contract was scheduled to run until 1993 but will expire as of September 1992. The decision reduces the value of the $228 million contract by approximately $35 million, which a CSC spokesman said "is not material" to the company's financial performance as a whole.

The spokesman said CSC, which is based in El Segundo, Calif., had been notified by letter of the state's decision, which he said did not mention any performance problems. "We disagree with their comments in connection with our performance," the CSC spokesman added.

Under terms of the contract, CSC serviced automobile insurance policies for people unable to buy insurance through regular means. The policies were underwritten by a state-sponsored agency. The other servicers for the contract include Policy Management Systems Corp. in Columbia, S.C.; Amgro, Inc. in Worcester, Mass.; and Warner Insurance in Fairlawn, N.J.

Given a declining number of policies to service, the state chose to cancel CSC's contract because "CSC has never had a passing score" on any of the state-sponsored audits, according to a spokesman for the New Jersey State Insurance Department. Additionally, he said, the company's complaint ratio — the number of complaints vs. vehicles covered — has also been consistently higher than that of the other three service organizations.

The CSC spokesman declined to comment on the state's audit results and said, "I don't know where those numbers came from." He said he did not have any internal CSC statistics that countered the state's results.

CSC is not the only computer company that has had problems with a New Jersey state automobile insurance contract. Back in October 1990, Electronic Data Systems Corp. (EDS) in Dallas started voluntarily withdrawing from an earlier, related contract that will expire later this year, according to an EDS spokesman.

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TECH TALK

Video camera on a chip

■ Scientists at Edinburgh University in Scotland have developed a chip that incorporates all the functions of a video camera. The chip opens up the potential for videophones and electronic surveillance systems, according to VLSI Vision Ltd., a new company formed to negotiate with industrial companies on royalties and joint venture projects.

"The 3mm-sq chip with 100,000 transistors is one example of the patented technology, which opens up a huge potential market in vision telephones, security and road surveillance, vision toys, bar-code readers, aerospace and robotic vision worth an estimated $9.75 million a year in royalties within three years," said VLSI Vision President Roy Warrender. The first prototypes of the chip were completed 18 months ago by six Edinburgh University scientists under the leadership of Peter Denyer and David Renshaw, but because of the commercial significance and the need for comprehensive patents, the device has been kept under wraps until now, the company said. The new chip will allow manufacturers to produce a full-function video camera the size of a wrist watch. It will operate silently and use minimal power. "We're looking at new applications where the low cost of the devices will create new mass markets," Warrender said.

Display tag team effort

■ Toshiba Corp. and IBM Japan Ltd. said recently they have started producing large-size, color LCDs at their recently completed joint venture manufacturing plant in Himeji, Japan. The plant is now making 10.4-in. displays with 640- by 480-pixel resolution and will gradually increase the size of the products, which are expected to become popular in portable computers once their manufacturing volumes rise and prices drop. The joint venture, called Display Technologies, Inc., was announced in November 1989.

Fluid dynamics comes down to earth

Faster, more powerful workstations bring this design tool to everyday manufacturing

BY J. A. SAVAGE
CW STAFF

Computational fluid dynamics, a concept already 250 years old, is starting to show up on graphics-intensive workstations. Color-gradient graphics, representing pressure as computer-generated air or water flows over an object, are slowly beginning to replace expensive and cumbersome wind tunnels. While primarily used in the initial design phases of airplanes, its use is rapidly expanding to such everyday items as automobiles as well as critical devices such as artificial hearts.

Two centuries ago, fluid dynamics was a derivative of the "what goes up must come down" theory, evolving to "what goes into a flow volume must come out." In the 1980s, the math behind the dynamics was done on supercomputers, but as workstations increase in speed and graphics ability, computational fluid dynamics is being brought into the realm of everyday manufacturing. In addition to increased efficiency of computers, software engineers are rewriting fluid dynamics' underlying algorithms to make them simpler yet more powerful.

Fluid dynamics, however, is most often used in the early stages of airplane design. The software can model the flow of air as it passes over such parts as a wing or an engine or across the surface of the entire plane. While engineers still use wind tunnels in the final experimental stages, fluid dynamics can cut down on the time and costs it takes to develop a practical design.

Fluid dynamics has greatly speeded the process of airplane design. Now airplane engineers "want to go from the geometry to a solution in one or two days," said Ed Tinoco, associate technical fellow at Boeing Commercial Airplane Group in Seattle.

The design process still takes "tens to hundreds of hours of computer time," said Thomas Edwards, assistant chief, applied computational fluids branch of the National Aeronautics and Space Administration (NASA) in Moffett Field, Calif. "We can afford to do that; industry can't."

Fluid dynamics *is most often used in the early stages of airplane design to model the flow of air across the plane's surface*

NASA develops computational fluid dynamics code and basically gives it to industry in its raw form. Engineers such as Tinoco develop their own applications from NASA's base.

However, the underlying code for fluid dynamics is not yet reliable enough to eliminate wind tunnel testing, Tinoco said. "[Computational fluid dynamics] is good at giving you lots of information. It's not good at bottom-line numbers like what is the drag of an airplane and what will it feel like to the pilot. You need information on thousands of points on a model and that can take up to 10 hours for each point. At that juncture, it's cheaper and faster to build a wind tunnel," he added.

Within computational fluid dynamics this is a well-known argument between the "experimentalists" and fluid dynamics engineers — who say that wind tunnels are rarely needed. However, in many areas of manufacturing, fluid dynamics can replace wind tunnels. In the near future, computational fluid dynamics will be used to design bicycle helmets and other everyday products.

Bicycle helmet design can use fluid dynamics in several stages instead of manufacturing prototypes by trial and error.

The algorithms can measure and visualize heat loss through the bicyclist's head, help design the helmet aerodynamically so there is less drag and help find the most efficient method of manufacturing the helmet through injection molding, said Philip Raymond, manager of the computational fluid dynamics group at Silicon Graphics, Inc. in Mountain View, Calif.

NASA is using fluid dynamics to help design artificial hearts. "If the disks that open and shut the valves are not designed correctly, they can tear blood cells," Edwards said. The appliances must be designed to allow blood to move through them fast enough to keep from clotting.

While fluid dynamics is promising, some software advances are still needed to make it easily applicable in design. Currently, developing a grid placed around an object that is needed to calculate measurements can take days or weeks.

"For a simple bike helmet, a visor or chin strap can make that process more difficult," Edwards said.

NASA project spins off 3-D sound system

BY MICHAEL ALEXANDER
CW STAFF

Call it virtual reality for the ears.

Crystal River Engineering, a Groveland, Calif.-based company, began marketing a system called Convolvotron that promises to deliver three-dimensional sound reproduction to headphone-wearing personal computer users.

The technology, a spin-off from an advanced research project sponsored by the National Aeronautics and Space Administration (NASA), enables IBM Personal Computer and compatible users to locate up to four independent and simultaneous sound sources in space. Convolvotron manipulates the listener's spatial perception of sound by simulating the acoustic cues the ears ordinarily rely on to gauge distance and direction.

Convolvotron is already being used in research and advanced development projects in a variety of fields, said Scott Fisher, designer of the system and president of Crystal River Engineering. It is used in the development of binaural hearing aids, in virtual reality systems and in devising early detection techniques for Alzheimer's disease, he said.

The 3-D sound system could potentially be used to create radically new home high-fidelity systems as well. Even with today's most advanced stereo headphone systems, the listener perceives that sound emanates from inside or near the head. With Convolvotron, the listener would hear sounds emanating not only from outside the head but also from the front, back, right, left and anywhere in between.

The system also compensates for the listener's movement. For example, a sound that appears to come from behind the listener will seem to come from the front as he turns toward it. A small locator device allows the computer to correct for the movement of the listener's head.

Crystal River Engineering markets the 3-D sound system for $20,000.

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EDITORIAL

Identity crisis?

There's a peculiar trend at work these days.

DEC has unveiled an aggressive campaign to prove it is not the proprietary company it had always been. Microsoft is trying to cast itself as a kinder, gentler company to shed the vicious competitor image it has had. IBM has resorted to some interesting moves (see below) to show the world it really isn't mired in its own bureaucracy. Lotus is determined to redefine itself as something other than a one-product company. AT&T is willing to recast its computer business in the image of another company altogether.

The list goes on, and in doing so, it begs the question, "Doesn't anyone like themselves anymore?" Or perhaps more appropriately, "*Why* doesn't anyone like themselves anymore?"

Changing one's approach to keep up with or even stay ahead of market dynamics is beneficial to the company and to the customer. What the customer absolutely must determine is whether the change is a cosmetic one designed to appease unhappy users or a fundamental makeover driven primarily by shifting customer preferences.

If you look around these days, you'll see an awful lot of atoning going on for the gross excesses of the 1980s. Debt-laden governments, corporations and individuals today realize just how badly they took their eyes off the ball.

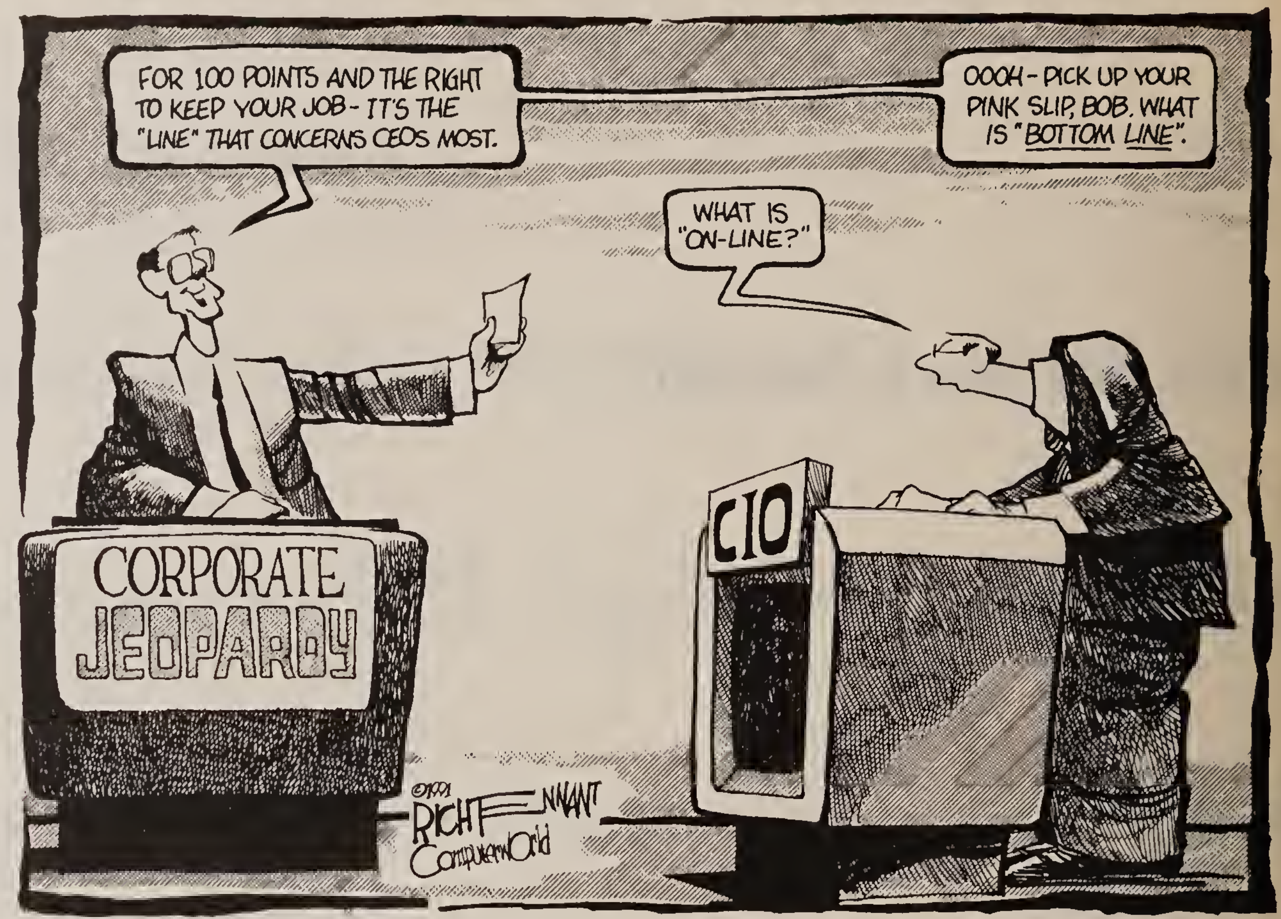
For many computer companies, the burden of the 1990s is the result of taking their eyes off their customers. They got away with it for a while, but the overbearing force of competition now has them scrambling for a share of markets they pooh-poohed in those heady proprietary days of not so long ago.

Case of the blues

And speaking of change, it sure looks as if that was one brilliantly executed "leak" IBM pulled on the big business papers recently, getting them to air at great length the gory details of the message of an unkinder, tougher Chairman John Akers blasting his sales, marketing and product development staffs. The tactic didn't do much to buoy the perception of IBM with the stock jockeys, although it likely sent some shivers through the rank and file at the company.

The tactic, however, is not new. We fished out an interview with Akers, published in *Fortune* magazine more than four years ago. In it, a quality-bent Akers warned his vaunted development laboratories that if customers didn't get the software they wanted, he'd let the marketing people go out and acquire it from outside vendors.

He stayed true to his word, going on a binge and buying into more than a dozen independent software companies a few years ago. Now the embattled chairman is back on the hustings, excoriating those same marketing people. It's almost getting to sound desperate.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LETTERS TO THE EDITOR

No bureacracy

Rep. Don Ritter is right: Manufacturing does matter [CW, May 6]. Manufacturing, mining and agriculture are still the means by which most of our nation's wealth is produced.

On the other hand, Rep. Ritter's seven terms in the U.S. House of Representatives have warped his judgment on how to re-energize private industry. He would have us believe that Congress and the U.S. Department of Defense can select, fund and manage the gestation of complex technological instruments.

However, the record shows that government and the DOD in particular are incapable of picking "high-tech" winners. Like Ada, bubble memory and VHSIC before it, high-definition systems are the wrong technology being promoted the wrong way by the wrong organizations at the wrong time.

Don't let high-definition display technology slip away from U.S. industry — keep Congress and the DOD out of it!

Dave Nelson
Information Engineering
Garmisch-Partenkirchen, Germany

Different thought

Regarding "Sterling announces initiative to focus on development" [CW, May 20], my comments concerning the effort and time it will take Sterling to fully deliver Corporate Applications Management Initiative (CAMI) were taken out of context.

CAMI addresses more of the pieces of IBM's AD/Cycle architecture than any other single vendor. Better yet, all of the products already exist. Sterling's approach allows an organization to implement any of the products in CAMI knowing that full integration is coming.

Sterling does not have to wait for the IBM Repository Manager because it provides its own repository technology, Sterling Integrator, within CAMI. This approach allows an organization to start implementing AD/Cycle today without risking its investment in the future. When the IBM Repository Manager becomes viable, the option will be available to convert because the Sterling Integrator is fully compliant with AD/Cycle and the IBM Repository Manager.

Finally, CAMI provides an open architecture facility where "best in class" tools can be linked to their repository. If Sterling does not satisfy a specific AD/Cycle requirement, a third-party vendor tool can be implemented without losing the integration.

Edward S. Topor
President
Casetek International, Inc.
Lake Bluff, Ill.

Gains a following

Regarding "Sterling announces initiative to focus on development" [CW, May 20], in which I was quoted, I have been very impressed by the strategic initiatives under way at Sterling Software's various systems software divisions, and I have been recommending investment in the company's stock.

I believe Sterling is now offering innovative products that help the data processing professional shift to IBM's vision of dispersed computing without making existing software obsolete.

As this becomes more recognized on Wall Street, I think Sterling could attract a wider following of other analysts.

Robert E. Williams
Investment analyst
The Principal, Inc.
Dallas, Texas

Unnecessary wait

It was very amusing to read the article by James Daly [CW, May 6] about the upcoming version of MS-DOS 5.0.

As usual, Microsoft will bring out its new DOS version with all sorts of hype about how great it is and how the masses will beat down the doors to get at it. I, however, will not be in line June 11. I have beaten Microsoft to the punch. Two months ago, I purchased Digital Research's version of DOS 5.0.

I have all the amenities touted for the new DOS version at my disposal now, including the removal of Qualitas 386MAX from my hard drive.

It also gives me great pleasure to exit into DOS, type MEM and see that I have 616K bytes of memory available without shuffling the system's files. So, good luck to all who will wait until June 11 for MS-DOS, when Digital Research DOS works now.

Walter E. Bialik
Marina, Calif.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

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Let's learn to look before we leap

We shouldn't develop wireless networks without checking the health risks

LOUIS SLESIN

At a time when the computer industry is scurrying to calm public fears over VDT radiation, a new source of electromagnetic radiation is being introduced into the electronic office — wireless networks. If computer companies want to gain acceptance for the microwave transmitters that will replace computer cables, they must think hard about the VDT experience and avoid making the same mistakes all over again.

Public safety — and good public relations — demand that the possible health hazards of wireless computer networks be investigated before hundreds of millions of dollars have been invested.

It is still unclear whether VDT radiation contributes to pregnancy problems or to the development of cancer. This is hardly surprising — not a single study has ever been carried out in the U.S. to investigate the effects of VDT radiation. Incredibly, American scientists have been unable to raise a dime to follow up experiments carried out in Sweden, which indicate possible risks to pregnancy. Industry and government officials alike pretend that the Swedish data does not exist.

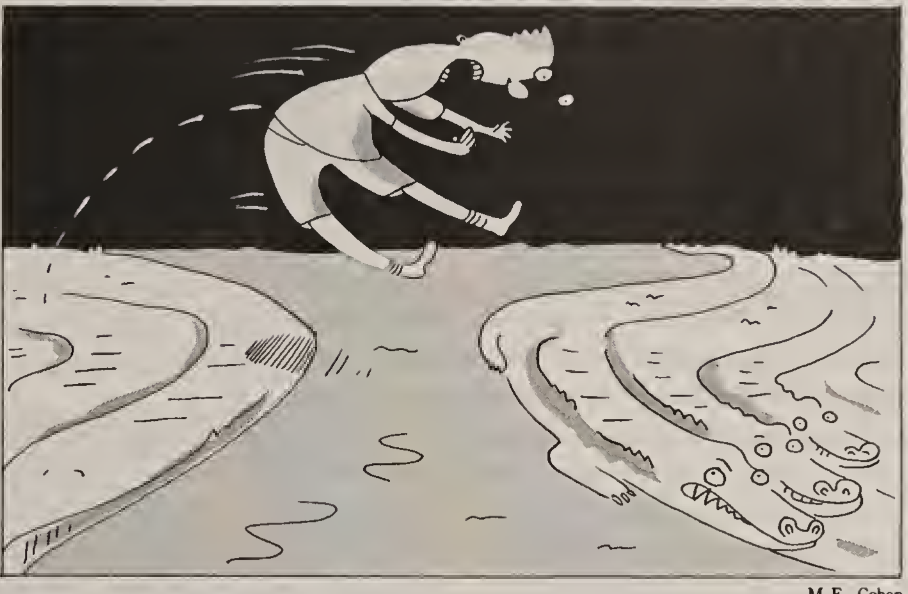
To its credit, IBM co-sponsored a study with Ontario Hydro in Canada — but, so far, nothing has been initiated for radiation research here in the U.S.

IBM and other companies that market low-emission terminals have never acknowledged that VDT radiation might present a health risk. Instead, they say they are responding to consumer demand for shielded VDTs. A lingering distrust of electromagnetic radiation remains — especially among those using one of the more than 50 million unshielded terminals.

Bigger unknowns

VDT radiation is an unintentional by-product of the deflection coils that move the electron beam in a CRT. Wireless networks, on the other hand, entail intentional sources of microwave radiation. NCR's Waveland system operates at 900 MHz. Motorola's Altair system (part of its new Wireless In-building Network) uses 18,000-MHz radiation, while Apple is planning to use 1,850 to 1,990 MHz for its Data Personal Communication Services.

Each of the microwave frequencies may be associated with similar, or possibly unique, health impacts. Microwave radiation is different from the extremely low frequency (ELF) and very low frequency fields emitted by VDTs. To be sure, wireless technology uses very low power signals to transmit information but, just as with VDT radiation, no one knows where the thresholds for ill effects lie. Nor are we likely to find out with the current level of research effort.



M.E. Cohen

A working group of the Institute of Electrical and Electronics Engineers is delving into the health issues related to wireless LANs, while developing an industry standard, but reliable risk assessments must be based on experimental data. Good intentions cannot make up for the absence of long-term exposure studies.

To support its contention that wireless radiation is benign, the computer industry is citing the American National Standard C95.1 microwave exposure limits. There is no doubt that the systems will conform to this 1982 standard and the proposed revision expected soon, but that is hardly reassuring. The standard is based only on short-term heating effects and not on possible long-term, low-level effects, such as cancer. Indeed, the Environmental Protection Agency has consistently refused to endorse it.

There can be a huge difference in the threshold for ill effects associated with short and long-term health risks. For instance, a number of epidemiological studies point to a cancer risk among children and workers chronically exposed to ELF radiation more than 1/1,000 times lower than the guidelines adopted by the International Radiation Protection Association in 1989, which are based on short-term effects.

Not long ago, experts scoffed at the possibility that ELF radiation could be dangerous at such low levels. But it is precisely this concern that started the rush to market low-radiation VDTs. What is considered low today may be too high tomorrow.

Anticipate questions

Some executives say that the public has reacted hysterically to the VDT radiation threat. Even if this is true, it means that people may one day overreact to the radiation threat from wireless computing. The only way to prevent a repetition of the VDT mess is for the computer industry to sponsor studies to answer some basic questions about radiation risks.

The controversy over microwave radiation health effects has been simmering for 25 years and is far from settled. ELF radiation risks were also on the back burner until a couple of key studies made the ELF/cancer connection a national issue. The public is notoriously fickle in its assessment of risks, and the microwave dispute could become front page news overnight. The time to find out about possible wireless radiation hazards is now.

Slesin is the editor and publisher of New York-based "Microwave News" and "VDT News."

The job description never said a thing about running a data center

DENNIS E. NOONAN

Like many professional personal computer users, I am getting fed up with the overhead involved with having a data center on my desk.

Here I am, sitting in front of a 386SX/20, with a full-color IBM Video Graphics Array screen, a 110M-byte hard disk, a modem, a mouse and 6M bytes of extended (or is it expanded?) memory. Boy, am I automated!

I have more technology on my desk than I could have possibly imagined even two years ago. I have an Ethernet connection to the mainframe and the local-area network. I can call up any node in the known universe. I don't miss a single electronic mail broadcast. And every memo I send out is scrupulously spell-checked.

But sometimes I just have to stop and wonder what, in good grief, I am doing with all this iron and wire when most of the useful software I use demands access to 512K bytes of my 640K-byte random-access memory.

My desktop data center keeps choking up because I can't free up the 200-odd K of RAM that's being held prisoner by a memory-hungry menu manager. When I complain to my friendly help desk techie, he tells me to check the device allocations in my CONFIG.SYS file. Thanks, pal, that's a lot of help. I don't even want to know what a CONFIG.SYS file is. What the heck does such a thing have to do with my job?

Detours and diversions

How are computer users supposed to be productive when every time we need a document, we must run down the hall to the laser printer to load paper or worse, change toner cartridges? And why is it that when I need information from the customer database on the VAX, I have to invoke something called Smarterm to make my expensive data center act like a cheap dumb terminal?

I think this whole process is pretty silly, but who am I to question leading-edge technology?

Techie friends advise me to write macros or to learn some programming. They also say I should upgrade to Windows and stop sniveling. A graphical user interface is just the ticket for worker weenies like me, they say.

But I don't need icons; I need intuitive information tools. I don't need protocols, or whatever you call them, to control my activities. I want enabling tools that allow me to energize and redefine my work. I don't need a bookshelf full of software that doesn't work together.

I have work to do. I don't want to spend half my morning doing disk backups or checking the CONFIG.SYS file or formatting floppy disks. Furthermore, I'm sick of having to read a dozen screens of READ.ME and insert 30 pages of errata notes in the manual every time I get a new software product.

It always seems that if I need data in a hurry, something will go wrong — the printer will be down for maintenance, the network will be "not responding" and there won't be a spare formatted disk handy. I never remember to check whether I'm printing in landscape or portrait and it always takes a few tries before I get the exact "look" I want.

> IT ALWAYS SEEMS that if I need data in a hurry, something will go wrong — the printer will be down for maintenance, the network will be "not responding" and there won't be a spare formatted disk handy.

It seems to me that the real obstacles to productivity are mundane chores and annoyances that seem to multiply as PC power increases.

We have been brainwashed to accept that complex machines will periodically fail and possibly wipe out a day's work (oops, sorry); that software doesn't have to be perfect (tell us exactly how and where you found the bugs and we may fix them next time); and that documentation doesn't have to be understandable (hit CTRL-C six times to escape, then warm start and check the CONFIG.SYS file for device allocations).

Willing donor

But designer techies don't listen to users. If they did, they might hear that the real power of machines like the Apple Macintosh is not the emphasis on the graphical, but the emphasis on ease of use. These machines hide the CONFIG.SYS file and they don't make you feel like a failed data center manager.

As for me, you can take my data center back and give it to somebody who wants to write macros. I need to get some work done.

Until recently, Noonan managed an end-user group at a Cambridge, Mass., software company.

Bethlehem Steel forges its DB2 administration with BMC Software.

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The time savings led technical analyst Mike Best to say that the return-on-investment has been "tremendous."

The other MASTERMIND products also provide comprehensive capabilities for Bethlehem Steel.

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COMMENTARY

Rosemary Hamilton

An IBM world view

While reporting on IBM's software business recently, we interviewed some IBM executives and had the chance to ask them about some nagging industry perceptions.

At times, executives took a question head-on and answered frankly. However, at other times, they offered their own perceptions, with which some people would disagree. In any case, it provided us with a good sense of how IBM sees the world. Following are some snapshots of these exchanges:

Perception: IBM's major software initiatives, such as AD/Cycle, are too mainframe-oriented. Some say the architectures are just another way to sell mainframes.

Response: "Well, this is a damned if you do, damned if you don't situation," said Robert Libutti, director of market strategy for IBM's Programming Systems Division. "The fact is, our customers have large mainframes. The fact is, that's where their problems are . . . So, [it's a question of] what do you do first, and we think we are doing those [things]. You've got to do the others in a real hurry. It's a question of timing."

When asked if he believed IBM was moving fast enough, Libutti said, "No, I wish we could go faster. We have made decisions, for example, in architecting some pieces of AD/Cycle by bringing our business partners in. In one way, that slowed us down, but then it will put us light years ahead in terms of getting the full function out there."

Perception: IBM should be saying more now about how these architectures will accommodate other platforms.

Response: "We try to talk about a two-year horizon because otherwise you get a bit into la-la land," Libutti said. "You start painting pictures on things you haven't done the technical work on, and you're creating visions."

Perception: IBM can not transfer the dominance it has in large systems to the desktop market.

Continued on page 32

Early testing a must for big systems

When software systems involve millions of lines of code, testing shouldn't be an afterthought

BY ELLIS BOOKER
CW STAFF

CHICAGO — It can test the mettle of even the most quality-conscious developer: a software package with a half-dozen integrated subsystems totaling perhaps several million lines of computer code.

However, automated environments able to analyze such complicated applications — ones that ensure that the millions of pieces fit together smoothly — may not be the answer, according to experts in the field. Those experts say the way they avoid big problems is to address the testing issue — either through tools or procedures — in the initial phase of a software project, rather than leave it as an afterthought.

Users may find more need for taking such precautions and for testing products as applications grow larger through the integration of numerous modules.

Test tips

"We believe these tools are not anything more than power tools," said Wayne Smith, regional vice president at Computer Power Group, Inc. in Oak Brook, Ill.

Smith's firm has been in the software testing business for 15 years, handling jobs that typically involve software with a minimum of 1 million lines of code.

Waiting until software is built to begin testing is asking for trouble, said Smith, who notes that the cost of fixing a flaw increases exponentially as the life cycle increases. "It can be 300 times as expensive to fix a bug in the integration phase than if it is caught in the requirements phase," he said.

One of Computer Power's products is a system to track the various stages of a quality test, which Smith argues can overwhelm users or developers familiar with techniques appropriate for checking the integrity of a program with only several hundred thousand lines.

At the simplest level, such audit procedures are vital, considering the accepted rule of thumb that for every 20 defects corrected, one defect is introduced.

"To integrate and test 5 million lines of code is an order of magnitude more difficult than [doing this on] a stand-alone system," agrees Carleton F. Kilmer, managing partner for aerospace and defense at Chicago-based Andersen Consulting.

Kilmer is referring to Andersen's Mac-Pac/D family of manufacturing management systems for the defense and aerospace industry. Nine months ago, Kilmer explained, Andersen began a major initiative to strengthen the testing component of Mac-Pac/D. A substantial part of the $48 million Andersen will spend this year on Mac-Pac/D will be allocated for the test engine work. He is quick to point out, however, that this is "virgin territory," that few companies have developed such a state-of-the-art test engine.

A more fundamental issue may be the development of industrywide, standard approaches to software testing.

Although the nuclear industry and the National Aeronautics and Space Administration have gone the furthest toward establishing software quality-testing methodologies, according to observers, the commercial marketplace has lagged behind.

On the other hand, developers and some end users of commercial software systems have begun using a common suite of testing tools, according to Beth Layman, research director at the Quality Assurance Institute in Orlando, Fla.

Among these tools are "capture/playback" systems that allow the user to enter test data and describe expected results and have the tool check to see if the expected result matches the actual result. Comparison tools, which compare code and data files, are common, as are code analysis tools, which report on the complexity of a given piece of software coding.

However, subjecting software to conditions as close as possible to the real world is always an essential step, said Jim Straw, district manager of 4ESS technology at AT&T.

The 4ESS, the digital switching system at the heart of AT&T's long-distance telecommunications network, is a complex hardware and software environment — first created in 1976 — comprising 115 switches and software, that has grown to contain millions of instructions and thousands of features.

"We want to simulate the real AT&T network . . . but we don't want to test [hardware and software] in the real network," Straw explained.

The AT&T approach

AT&T's solution is the ITN, for integrated test network, a microcosm of the real AT&T telecommunications system, complete with several switching, database and signaling systems but totally separate from the "real" network that carries customer traffic.

Hardware and software is exposed to ITN after earlier tests in the laboratories of Bell Laboratories, AT&T's research and development arm.

But the ITN is not perfect.

One software patch that got through the test bed last year caused the worst network disruption in AT&T's history.

The Martin Luther King Day outage, which disrupted phone service to millions of AT&T customers last January, can be used as a model of how difficult it is to eradicate bugs from enormous and complex systems.

That bug, in fact, lay dormant for nearly a month before a set of four or five events occurred in succession and caused it to activate, bringing the AT&T network crashing down.

MSA users hold last Interact meeting

Customers of the former MSA and M&D will gather next year in Atlanta

BY SALLY CUSACK
CW STAFF

ANAHEIM, Calif. — An era ended last month when 3,500 former Management Science America, Inc. software customers gathered for their last official Interact user group meeting. The company was merged with McCormack & Dodge Corp. to become Dun & Bradstreet Software in March 1990.

Michelle Pihos, chairwoman of the Interact user committee, said that next year's conference will see the merger of customers from both companies. The meeting will be held in Atlanta sometime in April.

"We don't have a name for it yet — we are just calling it User Week," Pihos said. The combined user groups will create a 10,000-member organization.

Concerns about neglect

According to Pihos, users attending this year's conference needed to get a "warm and fuzzy feeling" that neither side of the product house was, or would be, neglected in terms of support and development.

"We had a chance to talk to D&B Software's management team and hear them address issues," she said. "I am confident that they got our message."

Since the merger, some product enhancements have been neglected, and users wanted reassurance that the situation would be remedied, Pihos said. She mentioned an expert management reporting feature of the E-Series General Ledger as an example of an enhancement delay.

Next year's user group attendees will expect to see more development in the promised client/server area, Pihos said.

John Landry, executive vice president at D&B Software, addressed the client/server issues, saying that migration would progress in an incremental, step-by-step process for both E- and M-Series clients.

He also said that some components of this technology would be available by the end of 1991.

In a speech to users, Landry was reported to have said that he did not believe the "traditional competition can afford to make this change quickly. All of our development employees are being extensively trained in the key technological building blocks of client/server."

"They have an enormous project ahead of them," said Clare Gillan, manager of application solutions at International Data Corp., a Framingham, Mass.-based market research firm. "I expect their competition will try to take advantage of this transition period."

In addition to traditional competitors such as Computer Associates International, Inc., Gillan said that D&B Software will be feeling pressure from new sources, such as Sap America, Inc. in the manufacturing sector and Ross Systems in the Digital Equipment Corp. user arena.

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A wave of a wand tracks buying habits

ON SITE

BY CAROL HILDEBRAND
CW STAFF

Picking up a few groceries seems like a mere chore, not enough to be important. But he who buys a box of Cheerios as opposed to the Rice Krispies right down the aisle is closely followed by manufacturers — the knowledge can save them advertising money and rake in extra sales.

NPD/Nielson, Inc., a member of A. C. Nielson Co. family of companies, has evolved from using a handwritten diary method of collecting data from survey households to capturing data using customized technology that not only eliminates data entry costs but also improves data accuracy.

Headquartered in Port Washington, N.Y., NPD/Nielson has a stable of 15,000 households nationwide recruited on the basis of demographic characteristics such as income, education and age. "We're looking for a representative group of households for the U.S.," said Mike Oak, vice president of information services at the company. "These homes are used as projections of what the U.S. is doing."

Recruited households carefully track their shopping habits. Each time they submit information to the company, they are rewarded on a point system. They can trade in the points for various types of gifts. Long-standing survey members gain special status, such as gold or platinum standings, and are allotted extra points.

Survey households are equipped with a bar-code reader, or what Oak calls a wand, that has been customized for this use. As a purchase comes out of the bag, the shopper scans the bar code with the wand.

This bar-code reader *helps NPD/Nielson organize data based on consumers' shopping habits*

The wand is preprogrammed with pricing from stores that participate in Nielson's "Scantrack" program. It is then a matter of entering the number of units bought. If that box of cereal came from a non-Nielson store, the lack of preprogrammed numbers will cause the wand to prompt for prices. It will also ask whether or not the buyer used a coupon, or whether the item came from a special promotional display, Oak said.

Once the information has been input, it is transferred via modem to a personal computer-based front end, and from there to two Hewlett-Packard Co. Series 3000 980 minicomputers with nearly 100G bytes of memory, Oak said. Analyzing the information yields such information as what outlet a manufacturer's products are moving through and how different demographic groups react to particular discounting and pricing policies.

Trial and error

Oak said that NPD/Nielson went through several testing stages before moving away from paper-based data collection and onto the system it is currently using. "We tested the major markets first — New York, Chicago and Los Angeles — before we launched the full panel about three years ago," Oak said. "These devices are not cheap for the amount of them we're talking about." He added that NPD/Nielson presently uses wands from both Handheld Products, Inc. in Charlotte, N.C., and Telxon Corp. in Akron, Ohio.

Expensive or not, the wands have allowed NPD/Nielson to expand the amount and type of data it captures. "In the past, we just collected data on 20 or so product categories," Oak said. "This allows us to have data on just about everything that's bar-coded."

Another plus is the fact that collecting the data from a household rather than from the point of purchase allows the company to more accurately track a consumer's spending habits. "We're not tied to a particular store," Oak said. "Because the source of data capture is in the house, we can capture all outlets, from warehouse stores and regular supermarkets to mom-and-pop operations."

Having the household members scan in the data has cut data entry expenses as well, Oak noted. "Basically, we don't have a data entry staff — our data entry staff is at the households out there." He estimated that if his current survey sample were using paper diaries, he would need approximately 100 people to input and edit the data.

The success of this program has prompted the company to begin expanding the number of surveyed households from 15,000 to 40,000 over the next several years.

At the same time, NPD/Nielson plans to phase out both its paper diary-based and store-based collection efforts.

Tandem system lightens trucker's load

BY JEAN S. BOZMAN
CW STAFF

PORTLAND, Ore. — Consolidated Freightways, Inc. wanted to throw away all the paper that was piling up at its 1,000 trucking depots nationwide — 50 million documents per year.

Those paper piles should stop growing now that CF has become the first user of Tandem Computers, Inc.'s new image-processing system, a combination of Tandem products that were integrated over the last four years to meet CF's specifications.

The enterprisewide imaging system, which cost nearly $10 million — including hardware, software, consulting and installation fees — was officially put into production in mid-May. It will translate all of those paper bills of lading and delivery notices into digitized images that can be stored on hard disk drives and optical discs at CF's data center here, according to spokesmen for the Menlo Park, Calif., company.

The CF system is built on Tandem's Tandem Image Processing System (TIMS), which was officially announced for general use in April.

TIMS, developed by Tandem software engineers in conjunction with CF's information systems planners, was originally designed in response to the trucking firm's request for proposal, issued in late 1987. Scanned images of the trucking receipts generated throughout CF's enterprise will be forwarded to Portland for storage and for retrieval by more than 6,000 customers nationwide.

No central site

"We were well aware that optical storage offered us a suitable alternative to solve this massive paper problem," said Phillip Seeley, CF's vice president of MIS. "The problem was that the optical storage systems then available were largely for centralized processing. We wanted a wide-area network solution, because we didn't want to move all that paper into a central site to archive it."

The technical solution to CF's distributed archiving requirements involves several Tandem VLX systems, based here, and 48 Tandem CLX midrange processors, running at 48 scanning centers scattered throughout the U.S. Each Tandem CLX has a 300M-byte storage capacity, allowing it to collect thousands of scanned documents before sending them to the Tandem machine in Portland over CF's T1 backbone network, Seeley said.

Special imaging workstations — IBM-compatible personal computers outfitted with special image-recognition "cards" — handle data compression and identify bar-coded labels to create indexed files. The index resides on a Tandem Nonstop SQL relational database in Portland and directs users to images on disk drives or optical drives.

There are 100 people assigned to the scanning process, working in two shifts nationwide to make sure that documents are digitized within hours of their creation on paper, Seeley said. As of last week, 190,000 documents were being scanned and digitized each day and then sent on to the central computer room.

Once here, the digitized documents are recorded both on Tandem disk drives and on Tandem-label Hitachi Ltd. optical disc drives, which house 12-in. optical platters. Each double-sided optical platter has 2.6G bytes of capacity. The documents can then be accessed on-line, via disk drives or off-line by accessing the correct optical disc.

IBM connections

CF's system accommodates the use of IBM 3270 terminals at 6,000 customer sites, all of which are tied to CF's IBM mainframes here.

"If a customer calls up asking for proof of delivery, they key into the IBM mainframe, which then routes the request to the Tandem [VLX] machines via IBM's LU6.2 protocol," Seeley said.

Once requested, the digitized documents, which are stored with standard fax protocols, are sent to the customer via standard fax machines.

Tandem plans to offer specialized consulting help to other users who plan to install TIMS, said Jeri Edwards, manager of imaging strategy at Tandem's Cupertino, Calif., headquarters.

JCL tools assist users with changing needs

BY JOHANNA AMBROSIO
CW STAFF

A new duo of tools is now helping users whose shops are undergoing conversions, consolidations or other kinds of changes.

The software, called JCL/Convert from MB Solutions, Inc. in Denver, searches through job control language (JCL) statements and finds all references to names of files, programs, jobs and procedures. Once all of these are cross-referenced, users can change all of the names by issuing global commands.

Steven Smuts said he used the tools when he was a systems programmer at the Texas State Comptroller's Office in Austin. Smuts is now a senior programmer/analyst at the Texas Guarantee Student Loan Corp., also in Austin.

"We had a massive JCL project where we had to change data set names to conform to newly written standards," he said. "The problem was that everyone had their own naming conventions, so we standardized."

Time savings involved

Smuts said the project involved 1,500 production JCL members and approximately 650 catalog procedures. "Doing all this manually would have taken time we did not have," he said JCL/Convert saved "at least" 200 hours of work, he added.

Bob Grant, an applications toolsmith at Security Life in Denver, said he uses JCL/Convert to "maintain a cross-reference of where files and programs are within JCL. We use it for impact analysis during maintenance to see what jobs would be affected by a change."

Grant said that JCL/Convert is "real thorough" and searches through places that some competitive products do not. "In general, I've been very happy."

Other users, MB Solutions said, have used JCL/Convert to standardize naming conventions when two or more data centers consolidate.

JCL/Convert is a repackaging of two existing MB Solutions products, JCL/Cross-Reference and PDS/Manager. It is priced at $11,000 — a savings of 10% over the price of the two products purchased separately.

Transaction rate, cost linked in tests

Transaction Processing Performance Council releases first benchmarks

BY J. A. SAVAGE
CW STAFF

The 3-year-old Transaction Processing Performance Council recently found that Sequent Computer Systems, Inc.'s Symmetry 2000/200 was the most cost-effective of 48 systems tested in recent benchmarks.

In its first published results of tests in which transaction performance and system cost were related, the coalition of 42 vendors also found that AT&T's Starserver E with Informix Software, Inc.'s Online 4.0 came up with a lower cost per transaction than did 22 other systems tested in a database-oriented test — $2,670 per transaction.

In a test of a single, simple update-intensive transaction, a Sequent machine running Informix Online 4.0 tested at nearly 50 trans./sec. on a local-area network at a cost of $14,950 per transaction.

In contrast, Unisys Corp.'s A16-61E running Data Management System II was clocked at 272.5 trans./sec. at a cost of $43,190 each.

The council was organized in 1988 with eight original vendors, including Tandem Computers, Inc. and Pyramid Technology Corp.

System-independent

It has taken the group several years to publish its first results because each benchmark had to be built for a system that followed the council's specifications; that way, each benchmark was operating system-independent, a spokesman said.

In addition, it cost a vendor "tens of thousands of dollars and a couple man-months to run it" as well as to finish the documentation, according to the spokesman.

In future benchmarks, the council plans to address real-time complex data management and business service applications.

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Hamilton

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Response: "When you start looking at individual packages — graphics, spreadsheets — those things for the moment are really secondary in terms of where we would make our investment as opposed to building the workstation infrastructure," said Richard Goldberg, IBM assistant general manager of software marketing.

"It depends on how you answer it, OK? We haven't built a spreadsheet; that's fair," Goldberg added.

Perception: Systems Application Architecture (SAA) is still more concept than reality.

Response: "This is a half-empty, half-full issue," Libutti said. "SAA has made enormous strides. Now we are managing ourselves to those disciplines. We can have a lot of debate on that statement. As you get to the next level of integration with AD/Cycle and Officevision, clearly there's a lot more work to be done. We have started down the path and we are adding to it."

Perception: The products within SAAs are not being delivered fast enough.

Response: "I think at the architectural level, there are lots of good examples of customers moving into SAA, and it will accelerate," Goldberg said. "We are moving in an accelerated fashion."

Perception: The Officevision delays were a setback for IBM.

Response: "Look, there's no question we would have liked to deliver the next release of it," Goldberg said. "But when you look at what's out there, there are lots of people using Officevision for real productive work."

Hamilton is a *Computerworld* senior editor, systems and software.

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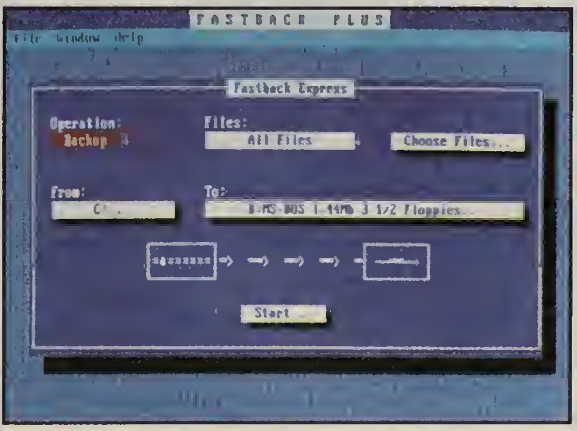

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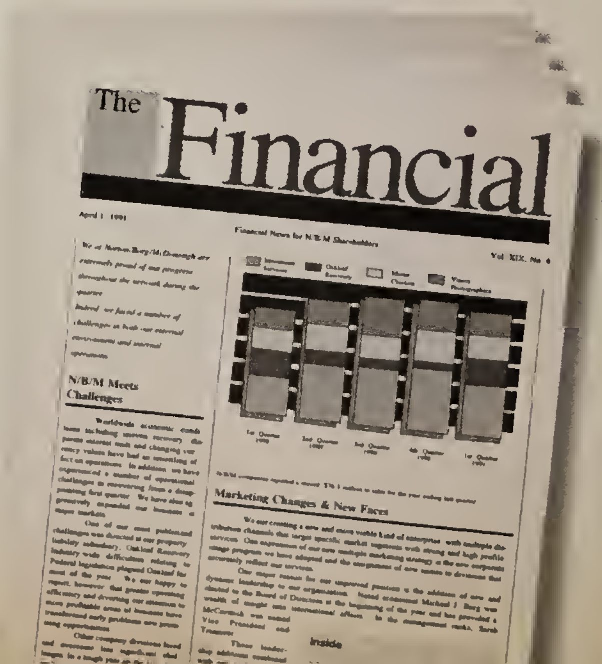

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NEW PRODUCTS — SOFTWARE

Database management systems

Candle Corp.'s Database Tools Division has announced an upgrade of DB/Explain, a SQL optimization tool for IBM DB2 databases.

New features in Version 2.2 include a custom macro facility, database application quality assurance and connectivity to IBM's Query Management Facility. In addition, the product also analyzes SQL performance and offers single-screen optimization.

DB/Explain runs under MVS/ESA and MVS/XA.

A license costs from $12,000 to $42,000, depending on processor size.

Candle Database Tools Division
6464 Savoy Drive
Houston, Texas 77036
(713) 952-8880

Development tools

On-Line Software International, Inc. has announced the availability of Ramis Information System Release 7.2, enhancing its information management system for end users.

The upgrade offers an improved MVS/CICS interface, a window for SQL commands and a Cobol FD Reader that allows Cobol file definitions to be read into the Ramis data dictionary. An interface for the SAS Institute, Inc.'s SAS System has also been added.

Prices for Release 7.2 range from $25,000 to $170,000, depending on processor size and operating system.

On-Line Software International
2 Executive Drive
Fort Lee, N.J. 07024
(201) 592-0009

Applications packages

Computer Associates International, Inc. has added a Collection Management System and a Recovery Management System to its integrated line of business applications software.

Both products support automatic account sequencing, real-time access, user-controlled job prioritization and assignment and automatic or selective letter generation. The Recovery Management System accounts for payment delinquency and automatically reports to the General Ledger.

Pricing for each application starts at $60,000 on the MVS and VSE operating systems. The Collection Management System is also available for the IBM Application System/400 platform starting at $30,000.

Computer Associates
711 Stewart Ave.
Garden City, N.Y. 11530
(516) 227-3300

Change Man, a change management software package for MVS systems has been updated by Optima Software, Inc.

Release 3.3.1 includes an option for linking Change Man on the host system to IBM programmable workstations via the Token Ring protocol, allowing workstation users to check out and stage source code from the mainframe. According to Optima, 15,000 lines of code can be transferred in one minute.

The program's DB2 option has also been revised, and an Information Management option is available for automatic updating of Information Management change request records.

Graduated processor pricing starts at $40,000 for the base system and $10,000 for the network option.

Optima Software
Suite 109
1765 Challenge Way
Sacramento, Calif. 95815
(916) 646-3800

Utilities

Goal Systems International, Inc. has created Faver for DB2, a utility for quick, efficient copying, restoring and reorganizing of IBM DB2 databases.

The product creates multiple copies in one pass and uses parallel processing to speed reorganization of partitioned table space. It also eliminates unused storage areas and optimizes free space in individual tables.

Prices range from $10,000 to $35,000, depending on hardware platform.

Goal Systems International
7965 N. High St.
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HARDWARE

Power supplies

Upsonic has announced uninterruptible power supplies for the network, minicomputer and telecommunications markets.

The PC Might Models 80, 140 and 200 offer up to 10 minutes of backup power and include software that automatically saves all active files on a network during a power emergency. Unix and Novell, Inc. networks are supported. External batteries may be added to increase backup time.

The 800 VA Model 80 costs $729; the 1.4 kVA Model 140, $999; and the 2 kVA Model 200, $1,795.

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COMMENTARY

Patricia Keefe

Improving Windows

Microsoft takes a hint. In a recent Microsoft survey, Windows users ranked the following attributes according to importance and usefulness: ease of use, ability to run multiple DOS packages, graphical user interface, applications integration and memory management. Chairman Bill Gates said he hopes to move applications integration to the top of the list.

In the meantime, Gates, who gave one of the keynote speeches at Comdex/Spring '91, said he wants to get the waiting time on the 2,500 Windows support calls that Microsoft receives daily down to less than one minute.

He also acknowledged that many of the problems users have today with setup and memory management can be avoided through better documentation and installation programs. "Windows is not as easy to install and use as it should have been," conceded Mike Maples, who heads Microsoft's applications software efforts.

Gates promised that close coordination with network providers will iron out networking issues, which industry observers say occur primarily on Novell

Continued on page 42

On the road to standard graphics drivers

BY MICHAEL FITZGERALD
CW STAFF

ATLANTA — Any user who has ever purchased a graphics add-in board only to have it not work with certain programs can take some heart from events that took place here before and during Comdex/Spring '91.

For instance, Microsoft Corp.'s Keith Laepple, program manager of the DOS and Windows business unit, addressed the Video Electronics Standards Association (VESA) meeting here before Comdex, with a stated aim of improving the performance of Microsoft's Windows environment when Windows 3.1 is released later this year. He told attendees that Microsoft, seeing a world where "nonstandard drivers may exceed standard drivers," wants to get a maximum number of drivers working with Windows.

"The significance of this is that Microsoft is opening Windows up to everyone's boards," said James A. Anderson, chairman of VESA and director of strategic marketing at board maker Headland Technology, Inc./Video Seven in Fremont, Calif.

Microsoft's move, which includes a soon-to-appear test suite of applications for board developers to test their own compatibility, may also represent a shift in graphics development, from needing hardware register compatibility with hardware standards such as IBM's Video Graphics Array to being able to write successfully to the application program interface (API) that is present in all software packages. This sort of shift would be transparent to users but would help eliminate incompatible cards.

Hardware not the issue

"Hardware compatibility is not the issue that it was in 1987," said Jon Peddie, president of Jon Peddie Associates, an Oakland, Calif.-based graphics research firm. "Today, hardware manufacturers of display controllers are obliged to provide a driver for either Autocad's API or Windows' [graphic device] interface. That becomes a neutralizing API. Therefore, it's of little concern to the software vendor or end user if hardware is the same or not."

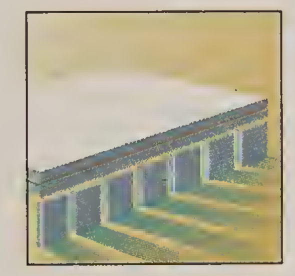
Still, Peddie said, hardware will continue to be important in defining graphics standards, in

Continued on page 40

Phoenix aims reference kit at 386SL-based portables

BY MICHAEL FITZGERALD
CW STAFF

NORWOOD, Mass. — In what it called an effort to boost development of portable computers based on Intel Corp.'s 80386SL power management chip for portables, Phoenix Technologies Ltd. announced its SL-Leader reference kit for developers.



The SL-Leader kit is hardware-oriented and contains a full, working model of a notebook-size form factor system board, complete with an 386SL chip, slots for flash memory, hard disk and floppy disk, fax/modem abilities and IBM Video Graphics Array monitors.

Analysts said this seemed to be a repackaging of several Phoenix announcements made in the past six months and was unlikely to generate a large number of new laptop OEMs.

"What Phoenix has done is some tweaking [to the system] and then reannounced," said John Dunkle of Workgroup Technologies, Inc. in Hampton, N.H. He added that given Phoenix's target market of overseas OEMs, the repackaging probably made sense.

Phoenix officials indicated it would probably package future BIOS products with a hardware reference kit.

"This reference design provides an ability for OEMs to focus on product differentiation and have product sooner," said J. Gerry Purdy, senior director of portable computer systems at Phoenix.

The reference kit costs $75,000, and Phoenix said it expected to sell no more than 50 of them. It also said it had already concluded most of its sales and negotiated widely different terms with OEMs.

Mastering speed

Keith Laepple, Microsoft's group manager of the DOS and Windows Business Unit, told VESA attendees that the firm is looking to improve Windows' speed. One less-than-ideal way, he said, is to use bus-mastering, the technology used by IBM's Video Graphics Array (VGA) follow-on, Extended Graphics Array, or XGA.

"Bus-mastering is not a good idea for Windows . . . You have less need of a co-processor but also less flexibility and less compatibility with VGA," Laepple said.

Laepple recommended a programmable co-processor as the most effective way to make Windows run faster. While Laepple did not recommend any single product by name, one example would be Texas Instruments, Inc.'s Graphics Architecture.

MICHAEL FITZGERALD

COBOL for Windows™ . . . *Get the Picture?*

The newly-released Micro Focus COBOL/2™ Version 2.5 now allows developers to write fully-functional Windows 3.0 applications with the standard WIndows API and the standard Windows development kit from Microsoft®. With Micro Focus COBOL/2 Version 2.5, existing character-based applications can be migrated immediately to the Windows 3.0 environment where they will utilize the Windows memory-management and windowing capabilities.

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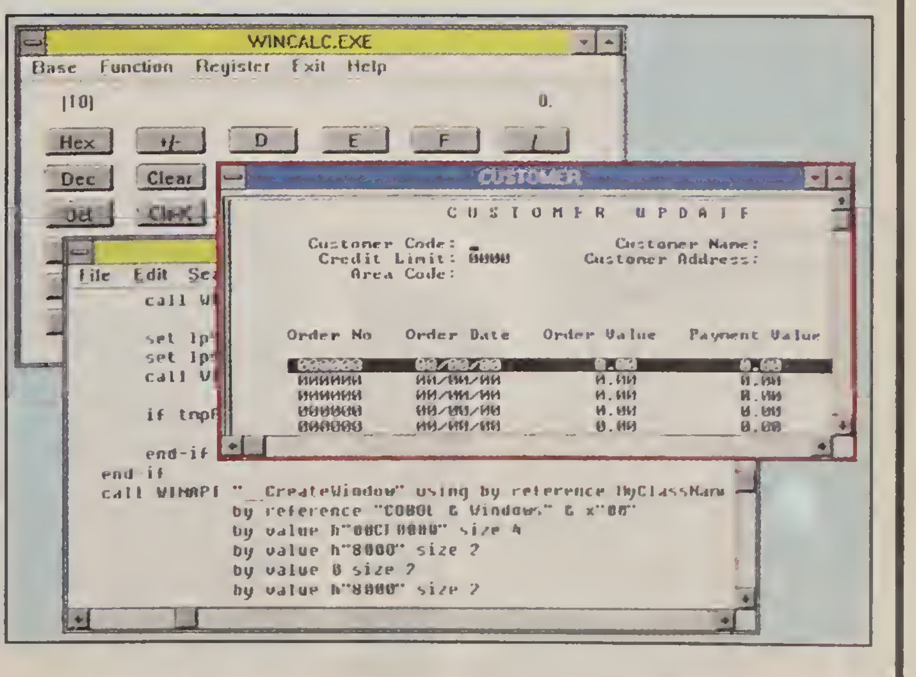

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CUSTOMER UPDATE

Customer Code: _                 Customer Name:
  Credit Limit: 0000             Customer Address:
     Area Code:

Order No     Order Date    Order Value    Payment Value

000000       00/00/00      0.00           0.00
000000       00/00/00      0.00           0.00
000000       00/00/00      0.00           0.00
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```

```
        call W
        
        set lp
        set lp
        call V

        if tmpR

        end-if
    end-if
    call WINAPI "__CreateWindow" using by reference MyClassName
                by reference "COBOL & Windows" & x"00"
                by value h"00CF0000" size 4
                by value h"8000" size 2
                by value 0 size 2
                by value h"8000" size 2
```

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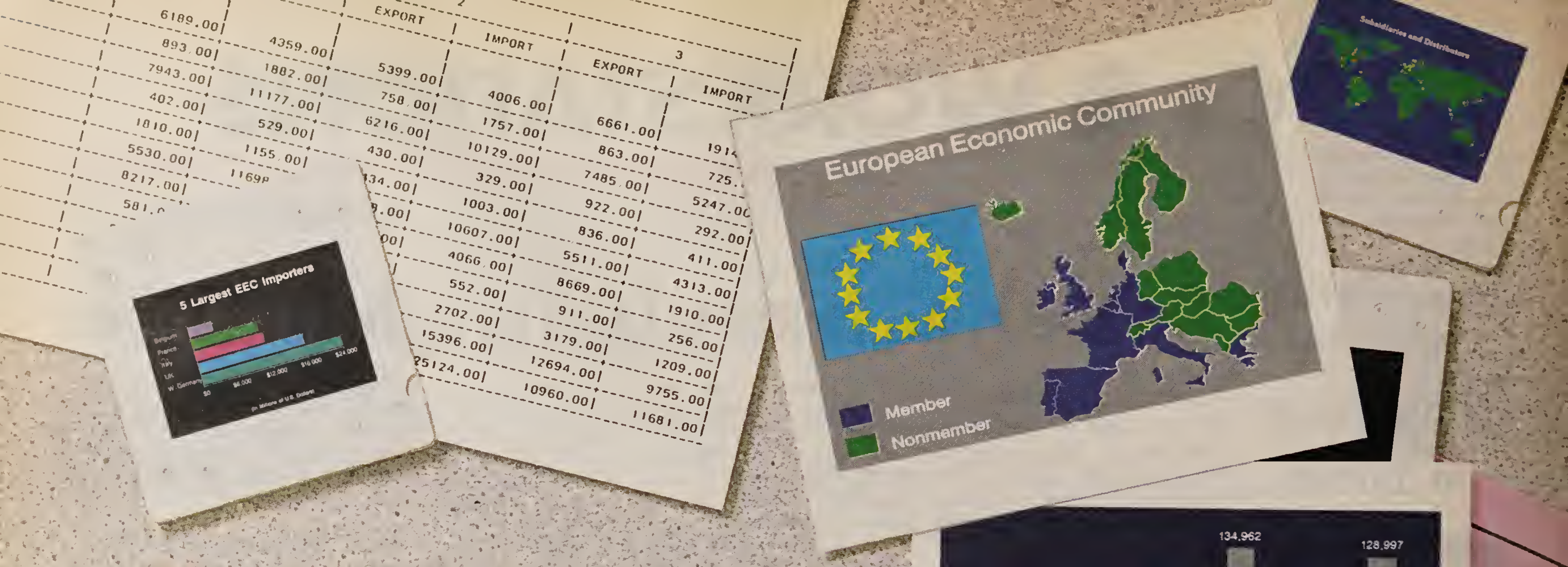

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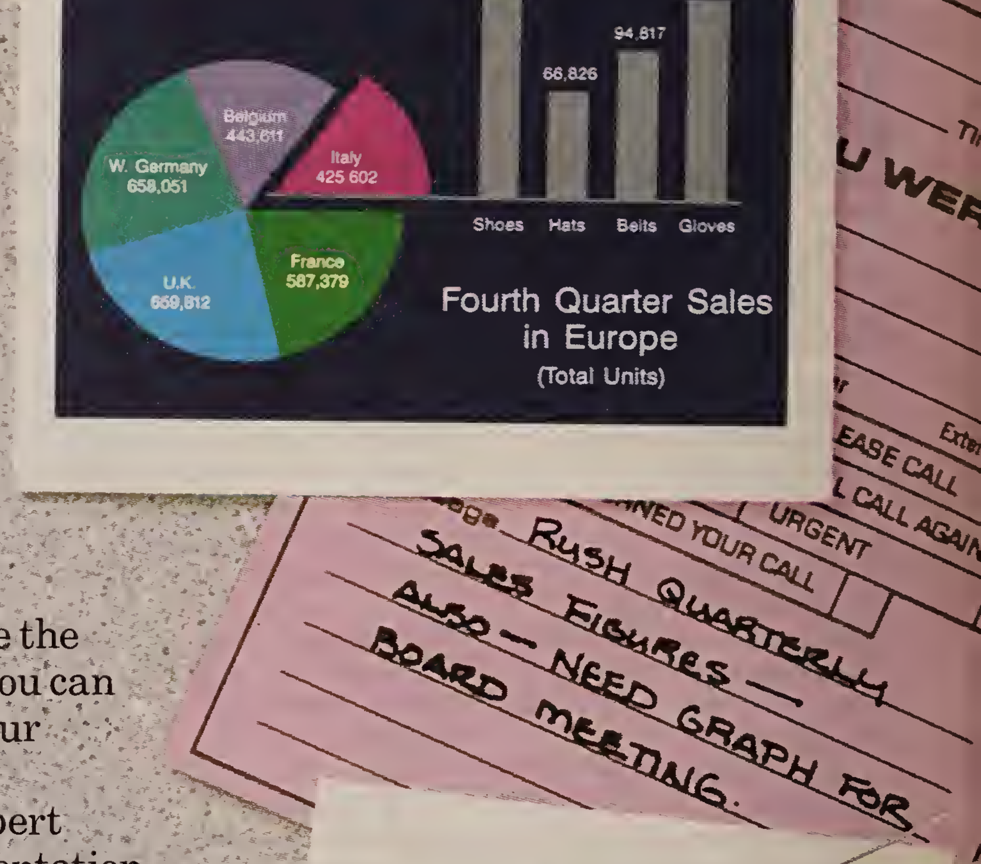

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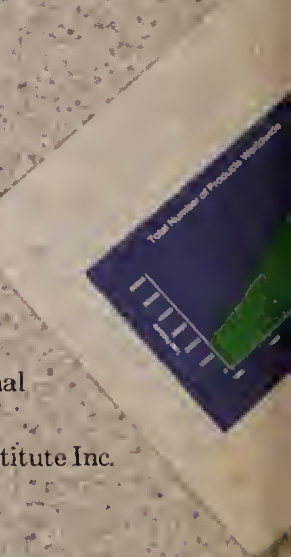
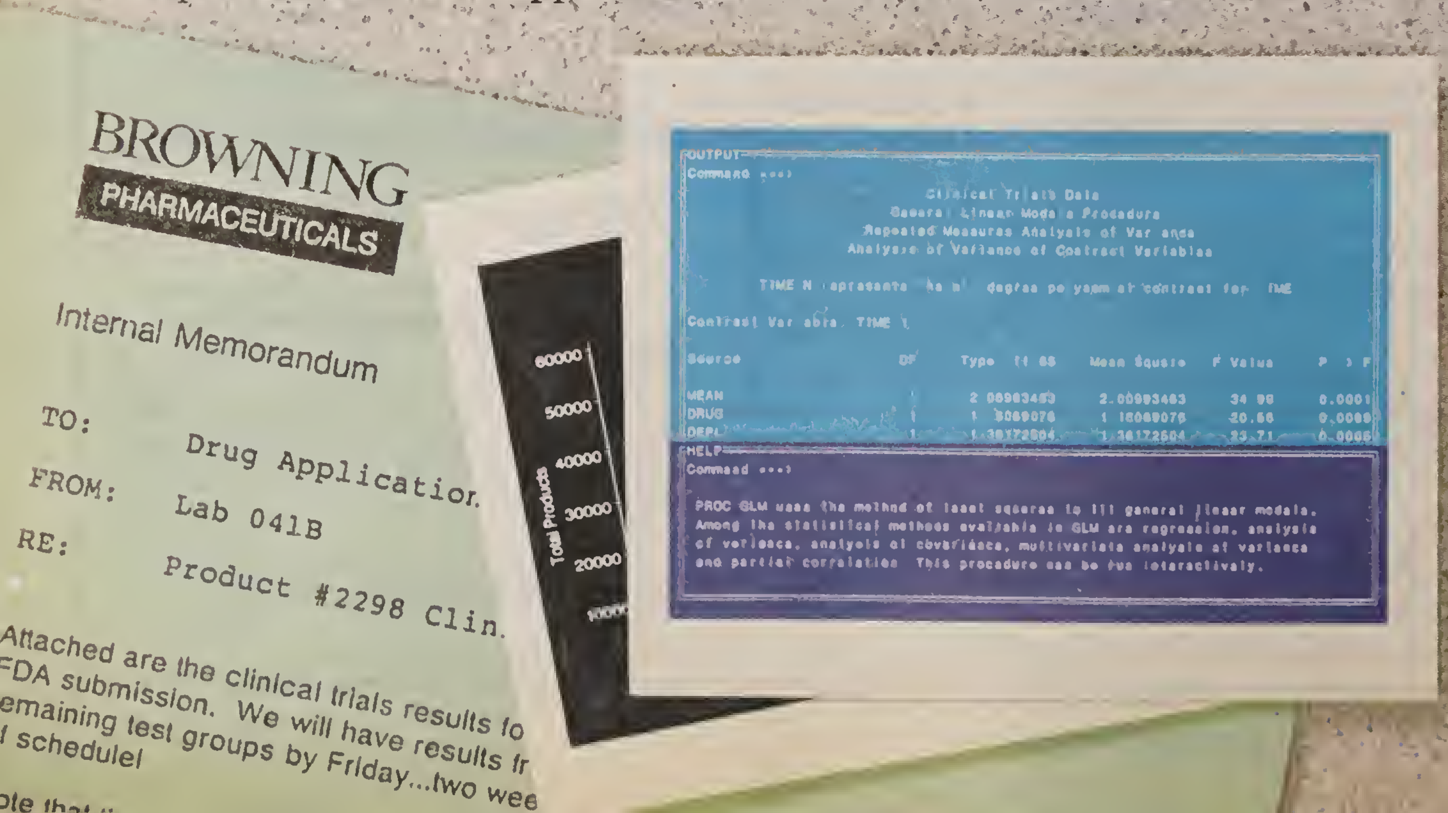




Silicon Graphics serves an ACE system

BY J. A. SAVAGE
CW STAFF

Taking one step toward an Advanced Computing Environment (ACE) operating system, Silicon Graphics, Inc. last week released Irix 4.0, which it says runs applications 10 times faster than its last operating system did.

"When the ACE specifications come out, it will be a recompile. It shouldn't be a rewrite," said Barbara Shelhoss, director of software product marketing at Silicon Graphics Entry Systems Division.

ACE is a consortium of 21 vendors that have said they will standardize DOS and Unix software on computers using the Mips Computer Systems, Inc. architecture. Silicon Graphics markets workstations using Mips processors.

Irix 4.0 is based on AT&T's Unix System V but has parts of the Open Software Foundation's Unix base.

"The ACE consortium is leaning toward OSF1," said Jim Terhorst, software product marketing manager. OSF1 will be used most in The Santa Cruz Operation's ACE. Vendors with AT&T's Unix System V Release 4 should also be able to use ACE specifications, Shelhoss said.

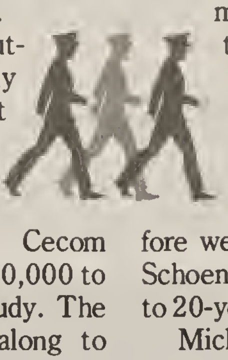
While Silicon Graphics may be betting on ACE, it is hedging its bets on software engineering. The code for what the firm does best, graphics, is separate from other functions, such as windowing. "In the old operating system, the windows commands were all intermixed in code," Terhorst said. With the next operating system — including whatever specifications ACE sets for it — the company will not have to rewrite all of its graphics code.

The new operating system will be generally available by the end of this year and will cost about $2,000, Shelhoss said.

Army considers developing battle-ready portable PC

BY MICHAEL FITZGERALD
CW STAFF

FORT MONMOUTH, N.J. — The traditional grunt complained about the food and smoked Lucky Strikes from a hard pack. Tomorrow's GI will still complain about the food but might be toting a cigarette-pack-size Soldier's Computer.



The Soldier's Computer currently exists only as a research project commissioned by the U.S. Army's Communications-Electronics Command (Cecom). Cecom awarded Agilis Corp. $50,000 to conduct a feasibility study. The contract was passed along to Texas Microsystems, Inc., a maker of ruggedized personal computers, when it purchased the assets of bankrupt Agilis.

"This was in thought stage three years ago," said James R. Schoening, an electronics engineer at Cecom's Advanced Systems Concepts Office. "Maybe in five years we'll be going out to buy them." Schoening said the technology the Army wants could be available in a one-pound package by then.

Among the Army's criteria for purchase are the following:

- The ability to support numerous applications, including a Global Positioning System that will supply instant updates on enemy field positions during battle.
- Voice and data messaging to reduce the confusion of troop movements during battle.
- Database derivations that might, for example, let technicians pull up repair manuals in the field.

"Conceptually, the ultimate goal is to outfit the entire army, but it'll be a long time before we get to that point," said Schoening, who estimated a 15- to 20-year rollout.

Michael Stewart, president of Texas Microsystems, said that despite his company's lack of experience with portables — it makes one such machine and bought Agilis for its ruggedized portable — he is confident that the firm will eventually compete for an Army contract and will also develop commercial versions of the machine.

Stewart said the feasibility study would take three to four months. Cecom will then decide whether to award a contract for an engineering prototype.

Music to GUI users' ears

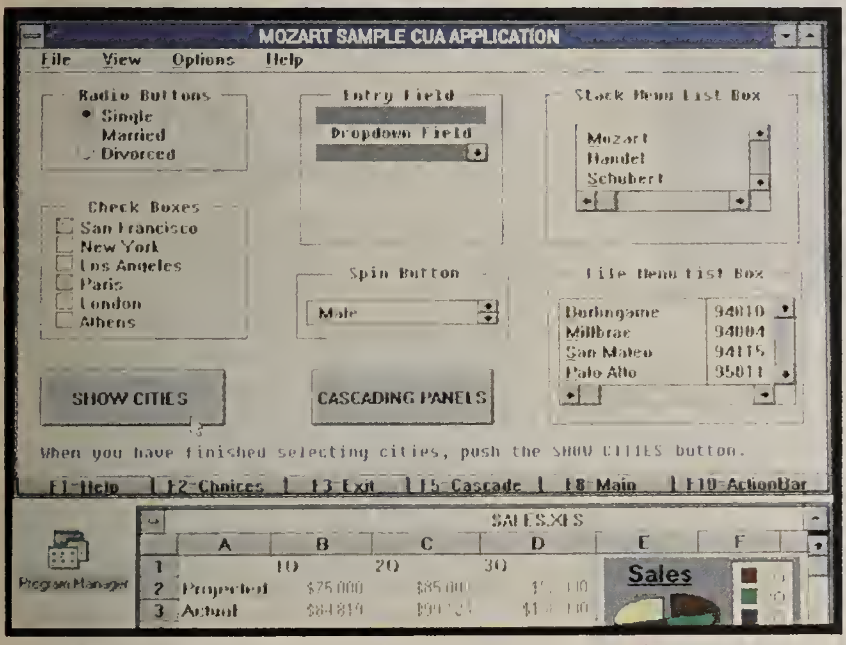
BURLINGAME, Calif. — Mozart Systems Corp. has announced an object-oriented applications builder that allows developers to build graphical user interfaces that will run without modification under both DOS and Microsoft Corp.'s Windows 3.0 environments.

Mozart 3.0 lets users sidestep a problem that has dogged developers: Applications developed on one platform must be ported to DOS and Windows 3.0, a process that normally requires considerable recoding.

It also lets developers streamline the crafting of complex applications. Mozart 3.0 allows development with existing personal computer configurations, so developers can build complex cooperative processing applications, for example, without costly hardware upgrades. The result: extended life for a firm's valuable host applications.

The application builder also supports all major Windows 3.0-specific features, including multitasking and direct data exchange, Mozart President Alan Parnass said.

Pricing starts at $7,000 for Composer, the development environment, and at $500 each for 10 to 24 licenses for Performer, the runtime module.



When you have finished selecting cities, push the SHOW CITIES button.

	A	B	C	D
1		10	20	30
2	Projected	$75,000	$85,000	[illegible]
3	Actual	$84,819	[illegible]	[illegible]

With Mozart, *graphical interfaces are easy to build*

Office for Mac revised

REDMOND, Wash. — Microsoft Corp. has revamped The Microsoft Office software package for Apple Computer, Inc.'s Macintosh environment to include the latest versions of a pair of recently updated applications.

Version 1.5 includes the Microsoft Excel Version 3.0 spreadsheet and Microsoft Mail Version 3.0 electronic mail system. It also has the Word Version 4.0 and Powerpoint 2.01 presentation graphics programs.

Excel was updated several weeks ago with more than 100 additions, including the addition of a Toolbar feature that lets users format cells or find the sum of a row or column with a single click of the mouse.

The refreshed Microsoft Mail is also packed with new features, including one that allows users to send multiple files by attaching them to a mail message. One caveat: The Microsoft Office contains only a client version of the mail software. At least one set of Microsoft Mail servers must be purchased separately and installed on a Macintosh workstation on the network.

The Microsoft Office Version 1.5 is available now and sports a suggested retail price of $849.

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SPF/2 has features not available on the mainframe. For example, **SPF/2** supports 48 PF keys, automatically adapts to the various OS/2 video modes (full-screen or text-window), and scrolls the file as you move the cursor. In addition, **SPF/2** has virtually instantaneous response time, 100% system availability, and no connect-time charges.

If you have a departmental or company-wide need for **SPF/2**, a special cost-effective Multi-User License is available directly from CTC. For information, call our Sales Department at (800) 336-3320.

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Vendors take economical path

Wyse Technology and AST Research bring out PCs

BY CHRISTOPHER LINDQUIST
CW STAFF

A pair of personal computer vendors, Wyse Technology and AST Research, Inc., took separate roads to affordability last week.

Wyse Technology's path to more affordable high-performance computing involved the announcement of systems based on Intel Corp.'s 80386 25-MHz and I486 33-MHz chips.

The firm's AT bus-based Decision 486/33T comes standard in a tower case with 4M bytes of memory, expandable to 32M bytes on the motherboard. Pricing ranges from $5,999 to $9,399, depending on configuration.

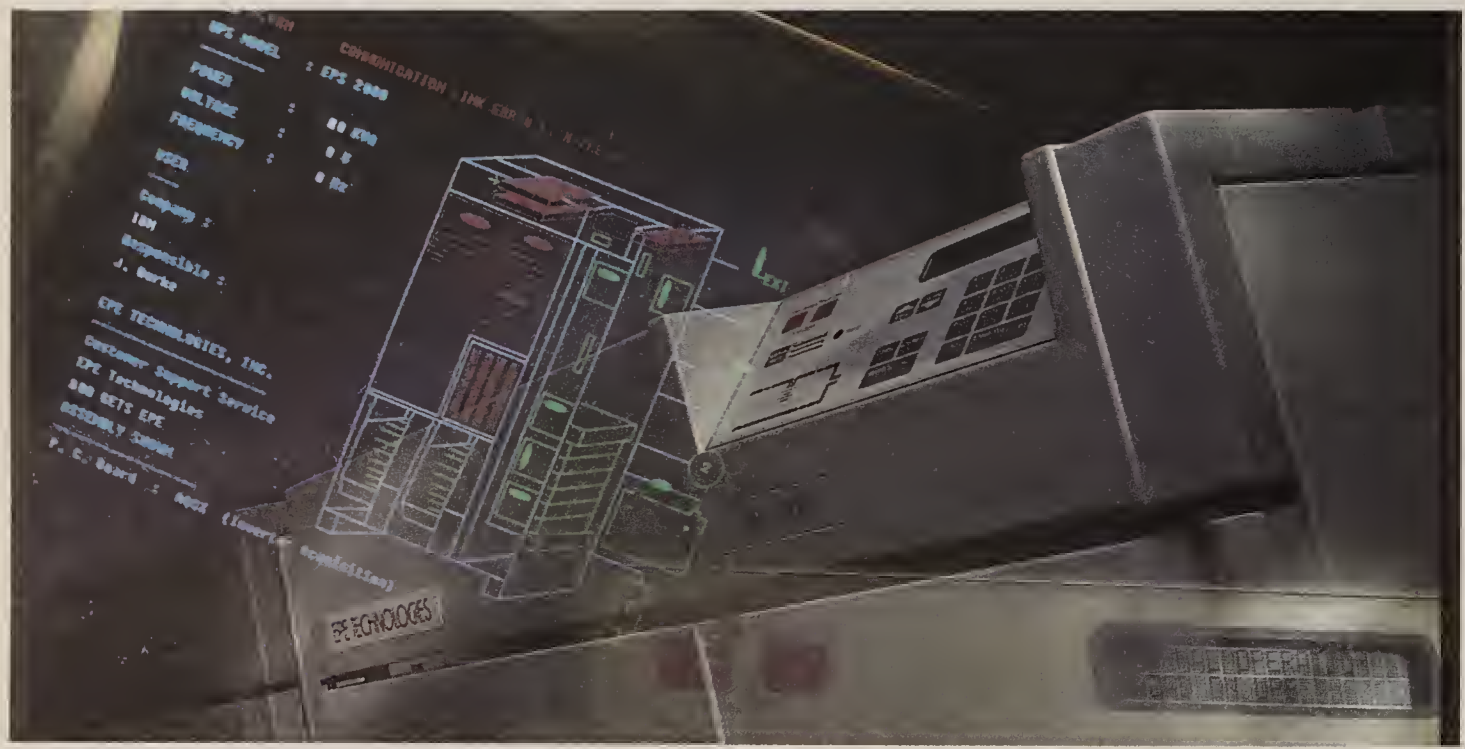
The Decision 386/25 comes with 2M bytes of memory standard, expandable to 32M bytes, and a 64K-byte cache. The system is priced from $2,599 to $3,599, depending on configuration.

Upgradable systems

AST Research took the low-end trail, padding its least expensive product line with upgradable systems based on Advanced Micro Devices, Inc.'s 16-MHz AM-80L286-16 and Intel's 20-MHz 80386SX chips.

The company is calling the Bravo 286/16 ideal for use as a network node. The PC comes complete with integrated Super VGA and 1M byte of memory and can support up to 16M bytes on the motherboard. The system can also be upgraded with a 20-MHz 386SX chip. Pricing begins at $1,195.

The AST Bravo 386SX/20 includes built-in Super VGA and 2M bytes of memory. Pricing ranges from $1,895 for a system without a hard drive to $2,895 for a system with a 40M-byte hard drive, Microsoft Corp.'s Windows, Lotus Development Corp.'s 1-2-3 Version 3.1 and a Microsoft mouse.



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Cirrus condenses video controller

FREMONT, Calif. — Claiming the CL-GD6410 controller will reduce the size and weight of portable computers while improving screen displays, Cirrus Logic, Inc. plans to release the chip today.

The GD6410 comes on a 4-in. video subsystem board; competing products can take up as much as 11 inches on a board, according to George Alexy, Cirrus' vice president of marketing.

"The issues in the portable market are display technology and the cost of that and the power curve," said Ken Lowe, an analyst at market research firm Dataquest, Inc. Lowe said the Cirrus chip may find buyers among OEMs. The chips will list for $52 each in quantities of 1,000.

The GD6410 features on-board random-access memory digital-to-analog converter, which lets it interface directly with an external monitor, on-chip LCD interface logic and power sequencing, which enables it to shut off the screen when applications are running, saving battery power, Alexy said. The chip also provides IBM Video Graphics Array resolution with 64 shades of gray and supports 800- by 680-pixel resolution.

Full production of the GD6410 is expected by September. Alexy predicted that machines using the chip will be on display at Comdex/Fall '91 in November.

Graphics drivers

CONTINUED FROM PAGE 37

particular for the huge installed base of non-Windows applications. He said two paths could develop, one focused on register compatibility with the display controller and the other software written to the APIs of major environments, such as Windows or OS/2 Presentation Manager.

While Laepple said his presentation "really wasn't intended to be a commentary on standards for video," others said it is part of Microsoft's move to make Windows a widely recognized standard.

"We believe it's Microsoft's intent to become involved with as many industry groups and standards as possible and open Windows to the point where there is no incompatibility between hardware and software," said John Dunkle, vice president of Workgroup Technologies, Inc. in Hampton, N.H.

Microsoft would not be alone in this goal: IBM has encouraged developers to write to the API at least since it introduced its 8514/A card in 1987.

This could present an opportunity for cards with "intelligence" to recognize which software applications are in use.

"Windows 3.1 is the first step to providing mechanisms for intelligent graphics," said Ken Lowe, an analyst at Dataquest, Inc. in San Jose, Calif. Lowe said a new generation of cards would greatly improve the speed of functions by recognizing when they are in Windows-based applications and using off-screen memory to store memory-intensive functions.

Still, Windows 3.1 is not even an official product yet, and VESA will not vote on an IBM Extended Graphics Array standard until Comdex/Fall '91, if then. Users will still have to suffer poor drivers for graphics boards for some time to come.

Wordstar 6.0: Solid, fast, dependable editing

Wordstar International, Inc.'s Wordstar Version 6.0

Reviews	Performance	Ease of use	Editing capability	Printer support	Network support	Documentation	Service and support	Value	Score
Infoworld 1/7/91	Excellent	Good	Very good	Good	Satisfactory	Very good	Very good	Good	6.6*
PC Magazine 12/11/90	NC	Awkward commands	Mix of old and new	Unique preview	NC	NC	NC	Upgrade almost obligatory	Still life in old classic
PC World 6/91	Good	Fair	Fair	Excellent	NC	NC	NC	Fair	Poorly integrated, fast editing
Users									
Thomas Murphy, Murphy Software Co.	■■■■	■■■	■■■	■■■	■	■■	NC	■■■	Impressive performance
Thomas Golway, Golway Computer Enterprises	■■■	■■	■■■	■	NC	■■■■	■■■	■■■	Performs well
Sandy Whatley, Bakersfield City School District	■■■	■■■■	■■■■	■■■■	NC	■■■	■■■	■■■	Keeps getting better
Analysts									
Oliver Picher, Datapro Research Group	■■■	■■	■■■	■■■	NC	■■■■	■■	■■■	A solid package
Scott Higgs, National Software Testing Labs, Inc.	■■■■	■■■	■■■	■■■	■■■■	■■■	■■■■	■■■	Right for current users
Jerry Caron, Faulkner Microcomputer Reports	■■■	■■	■■■	■■■	■■■	■■■■	■■■	■■■	Improved interface & service

Key: ■■■■ Very good ■■■ Good ■■ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey.
**Infoworld* score based on 1 to 10 ratings. NC: No comment

Technology Analysis — A roundup of expert opinions about new products. Summary written by free-lance writer Suzanne Weixel.

Wordstar International, Inc.'s Wordstar has been around since the dawn of personal computer-based word processing. Version 6.0, according to reviewers, reconciles the features that have kept customers loyal over the years by providing the advancements that new buyers demand.

Performance: Except for reformatting, which is not automatic, the core Wordstar word processing engine executes most functions quickly. The performance of the add-on modules, however, is slower and less functional. Wordstar requires 512K bytes of random-access memory and a hard disk for full functionality. File size is limited only by the disk space available.

Ease of use: Wordstar's CTRL-KEY command interface was developed before the advent of function keys, so users' fingers rarely have to leave the home row of the keyboard. This version also offers pull-down menus, although reviewers claim that the lack of first-letter shortcuts makes the menus clumsy to use. *PC Magazine* advised the user to learn the CTRL-KEY commands to navigate the command structure.

There is no mouse support. Novice users may be intimidated by the control characters and other dot-based commands that quickly fill most files, and reviewers complained about the lack of consistency among the interfaces of the different Wordstar modules and add-on programs. Luckily, on-line Help is quite good, they said.

Editing capability: On one hand, Wordstar offers some highly sophisticated features, such as its page preview, in which the user can display multiple pages on-screen or zoom in for a close-up view. A graphics card is required for the page preview feature. On the other hand, it can be quite primitive. For example, fonts can only be viewed when in preview mode. Also, the program cannot show columns side by side on the screen; headers and footers are limited in length to five lines; and line drawing is so awkward that *PC Magazine* claims it will never be used.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance	Outlook
Paul Stephens, Robertson Stephens and Co.	■■■■	■■■■	A turnaround
Alfred Tobia, Mabon Nugent & Co.	■	■	Poor

Wordstar International, Inc. in Novato, Calif., reported a loss of $2 million in retained earnings in 1990 compared with a gain of $2.5 million in 1989. Ratings are based on a telephone survey of analysts who track the company's financial performance

The spell checker and thesaurus are good, although there is no grammar checker or backtracking during a spell check. Both the add-on outliner and mail merge perform well. Like other add-ons, however, they are not very well integrated into Wordstar. The outliner cannot automatically create Wordstar files.

> WORDSTAR'S CTRL-KEY command interface was developed before the advent of function keys, so users' fingers rarely have to leave the home row of the keyboard.

Additional pluses are multiple-level indexes, concurrent endnotes and footnotes and the ability to open two windows on different files and define blocks in each window simultaneously. Missing are automatic style sheets and a table editor. Another drawback of this version is that only one style can be used per file.

Printer support: Wordstar supports the basic font and printer categories, including Hewlett-Packard Co.'s Laserjet and compatible printers that support Adobe Systems, Inc.'s Postscript. It also supports landscape printing on laser printers. According to *Infoworld*, it has some capability to kern text in pairs. Also, boldface, underlined and super- or subscripted type can be selected.

Network support: On a network, users can read a file that another user is editing but cannot save any changes. Spelling dictionaries, configuration information and printer driver files are all stored in user directories.

Documentation: Wordstar comes with a number of well-written booklets that include useful indexes. It has a tutorial, and reviewers said its online Help is among the best. The Help level can be set to automatically display CTRL-KEY menu options if the user hesitates after typing the first letter in a two-stroke command.

Service and support: There is a 30-day warranty and free but not toll-free telephone support. According to reviewers, technical assistance has improved quite a bit recently.

Value: Unless the user requires a great deal of formatting and layout, reviewers agreed that Wordstar is worth a second look. Some of its features may not be on the cutting edge, but its editing capabilities are solid, fast and dependable. The biggest obstacle is the learning curve required to get up to speed with the CTRL-KEY commands. But once users learn the commands, they become loyal fans of Wordstar's editing capabilities. Wordstar 6.0 costs $495.

Wordstar responds

Lisa Linnenkohl, Wordstar product manager

Performance: Reformatting is not totally automatic, but our customers have not complained that it is too slow.

Ease of use: In Version 6.0, we made certain features available in the add-on modules. Now we are working toward integrating them fully in future releases. We do offer limited mouse support for pull-down menus, and the Inset graphics program supports a mouse.

In the next release, due this fall, we will have full mouse support as well as first-letter accelerator keys for our pull-down menus.

Editing capability: We offer a wide variety of layout and formatting tools including scalable fonts, kerning and paragraph styles. There is no table editor, and it is not high on our users' priority lists. If we include it in a future release, we will also include support for parallel columns.

In the next release, we will integrate graphics conversion technology into the product.

NEXT WEEK

▶ Microsoft Corp.'s Word for Windows Version 1.1 is seen as one of the strongest products among word processors. With powerful basic features and advanced capabilities, it is also priced lower than the competition.

Keefe

FROM PAGE 37

networks. By addressing these concerns, Gates expects to reduce support calls by a factor of two.

Yeah, that's the ticket. Windows 3.1 will have have "literally thousands of improvements," according to Gates. These will include better developer support in the form of Open Tools and better software hooks, Truetype fonts, building an enhanced version of Object Linking and Embedding into the operating system and its built-in applications to provide greater levels of integration and improvements in performance and usability. A summer release is expected.

PART OF THE Patriot pitch is that there is a whole host of new and different applications waiting to be discovered once developers are freed from having to port their packages to multiple environments.

Then why the fuss? Gates briefly mentioned New Technology (portable) OS/2, stating he does not expect to achieve large sales volumes with NT, which is two years off. Then again, Maples said users won't see any impact from 32-bit processing. Asked if the same held true for 32-bit Windows, he nodded yes.

Put 'em up! Microsoft has definitely taken off the gloves. Ex-IBMer Maples complained about the "the myth that OS/2 is for line-of-business applications while Windows is for expert programmers." Also combating that idea, Gates shrewdly incorporated into his keynote demonstrations from three large accounts using Windows in mission-critical applications.

These included McDonnell Douglas, which is using Windows to help build the Space Station; Fidelity Investments, which is using Windows to improve its on-line customer service; and Otis Elevator, which is using the technology to cut its paper output and to speed report production worldwide. Maples claimed Microsoft shifted through at least 20 major accounts before settling on those three.

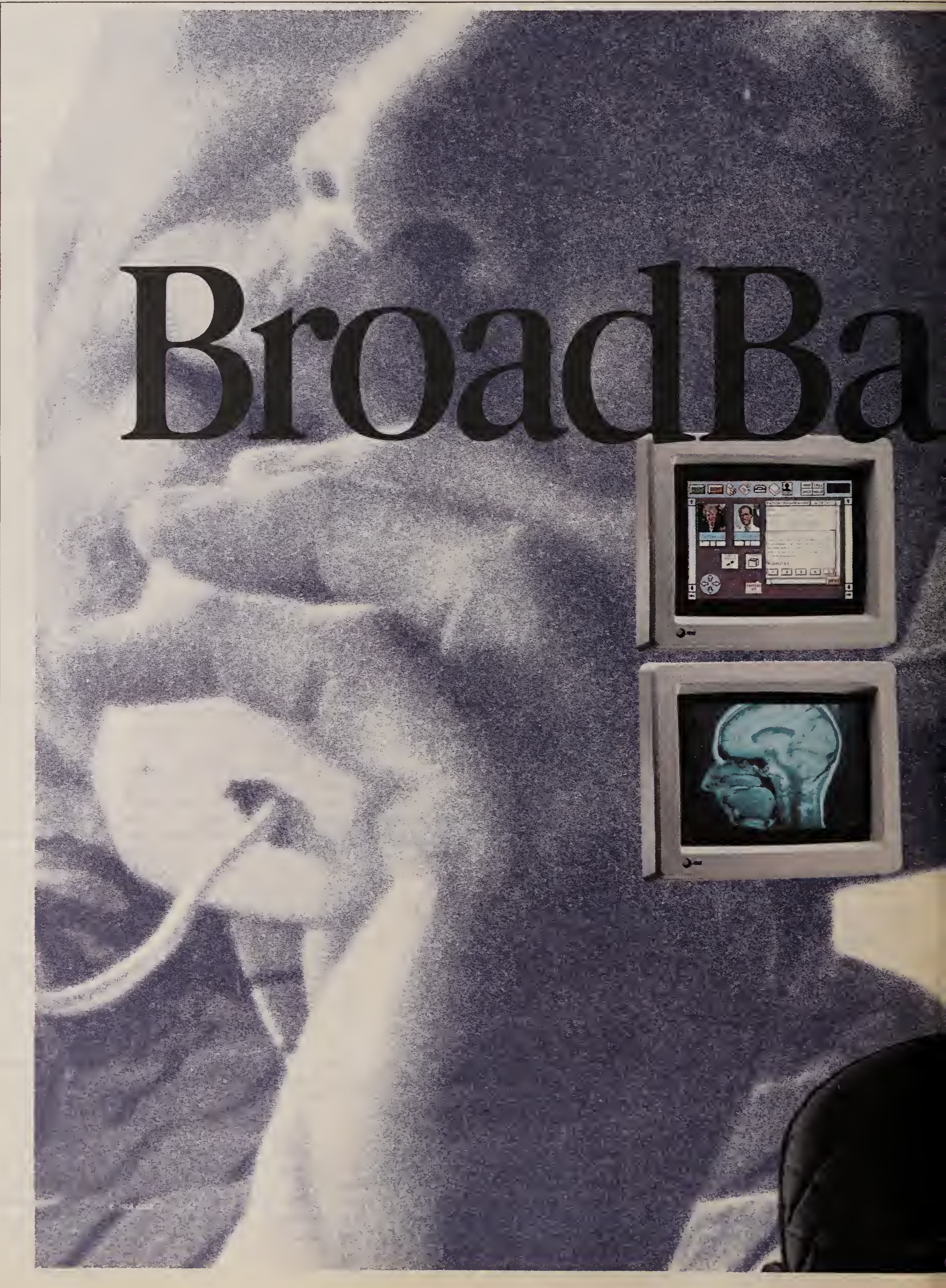
He's from Missouri. Maples also took aim at Patriot Partners, a joint venture between IBM and Metaphor Systems that is building an object-oriented shell to which developers of different 32-bit environments can write — once. Developers reportedly will only have to write one version of their software, and users will be able to run OS/2 and Unix software under the same shell. Sounds great, right?

Part of the Patriot pitch is that there is a whole host of new and different applications waiting to be discovered once developers are freed from having to port their packages to multiple environments. "I'm a software developer, and I can't buy into that. When I ask them what those applications are, they say they don't know," Maples said.

He also predicted that it will be difficult to get vendors like Sun and DEC, each of which have their own "open" platforms, to back the Patriot concept. "They want applications unique to their platforms," he said. As a result, it won't matter how easy Patriot's shell is to write to. "Just because it is easy to write to Nextstep doesn't mean it is a good business alternative."

Sounds good to me. Microsoft recently announced it has licensed Caseworks, Inc.'s Knowledge Assisted Software Engineering (KASE) tool set for inclusion with "future development products." A source claims KASE will be bundled in with Microsoft's Quick C, once it's ready to ship.

Keefe is *Computerworld*'s senior editor, PCs and workstations.



NEW PRODUCTS

OS/2 software

SPSS, Inc. has upgraded SPSS for OS/2, a statistical data analysis package.

Release 4.1 ($995) adds Dynamic Data Exchange support, logistic regression and matrix tools for the Advanced Statistics module and database management systems interfaces. The firm also announced SPSS Categories ($495), an add-in that performs conjoint analysis and optimal scaling techniques.

SPSS
444 N. Michigan Ave.
Chicago, Ill. 60611
(312) 329-2400

Development tools

Information Engineering Systems Corp. has released IE:Expert Version 5.0, a tool for designing information systems.

The DOS-based, Microsoft Corp. Windows 3.0-compatible program generates graphical maps of business and systems projects based on text input and indicates data dependencies between elements. It includes model analysis based on the firm's Information Engineering techniques to ensure consistency and completeness of all models. It also offers modification audit trails, a report generator and a SQL schema generator.

The product costs $17,500, with one year's support and maintenance included.

Information Engineering Systems
5th Floor
201 N. Union St.
Alexandria, Va. 22314
(703) 739-2242

Micro Focus has upgraded its line of Cobol language programming tools.

Version 2.5 of the Cobol/2 compiler ($750) includes support for intrinsic functions. It supports programming for Microsoft Corp.'s Windows 3.0 and IBM OS/2 Presentation Manager. The Cobol/2 Toolset 2.5 ($750) includes a memory manager that makes 16M bytes of memory, as well as file sharing and report writing utilities, available to the developer.

The Cobol/2 Workbench 2.5 ($2,500) comprises the compiler, tool set and several additional programming utilities. The package's Cobol Source Intelligence facility (a real-time analysis tool) and the Advanced Animator (a source code debugger) have been enhanced.

Micro Focus
Suite 400
2465 E. Bayshore Road
Palo Alto, Calif. 94303
(415) 856-4161

Software applications packages

Symantec Corp. recently announced Justwrite Version 1.0, a word processor for the Microsoft Corp. Windows 3.0 environment.

The product was designed for ease of use, Symantec reported. It includes automatic file format conversion, document templates, intelligent mail merge and support for Dynamic Data Exchange. Network operating systems from Novell, Inc., IBM and Banyan Systems, Inc. are supported as well.

Justwrite costs $199.

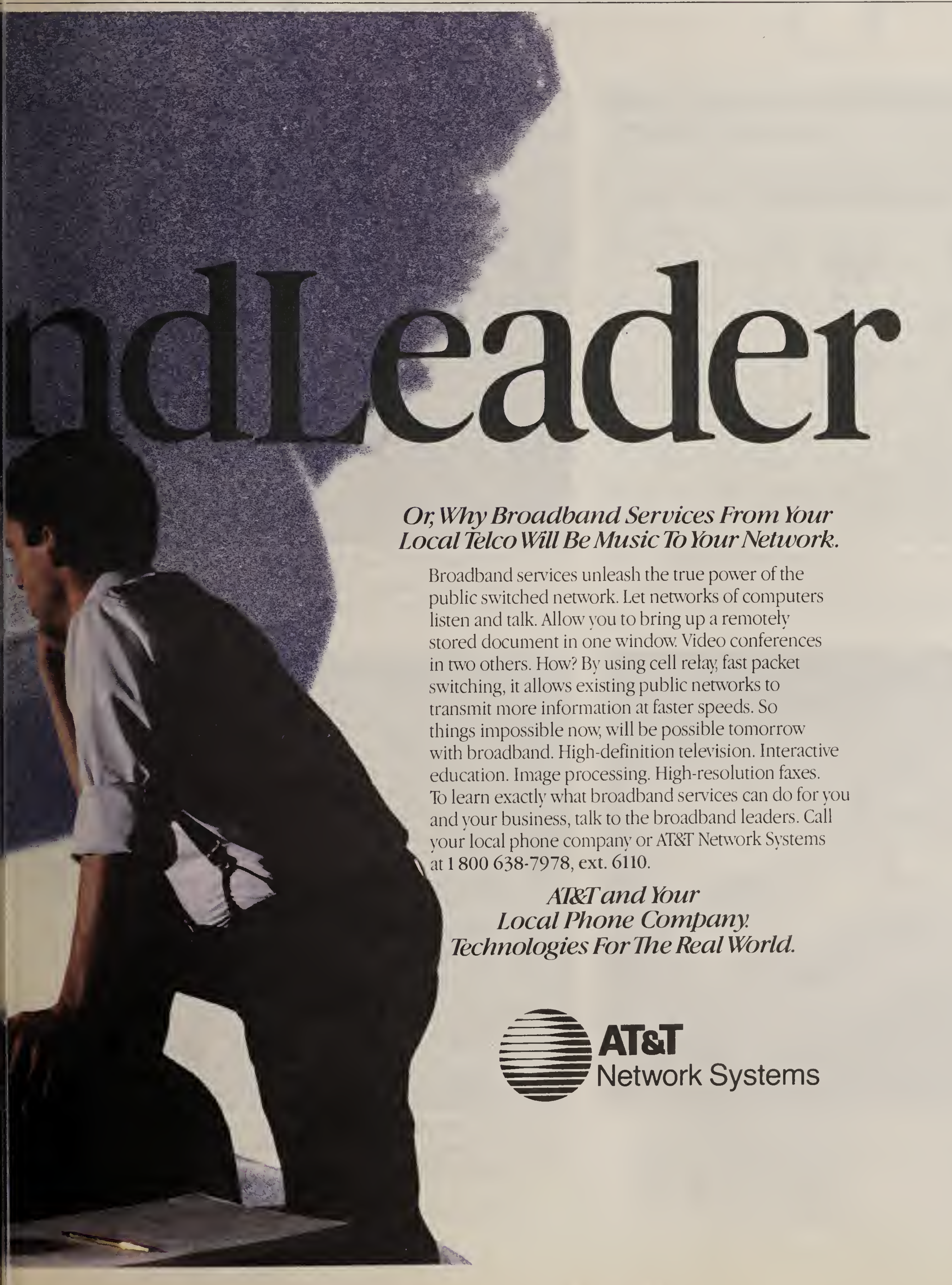
Symantec
10201 Torre Ave.
Cupertino, Calif. 95014
(408) 253-9600

Pageahead Software Corp. announced a software product that provides integration of leading database and desktop publishing packages.

The product, called Pageahead, runs under Microsoft Corp.'s Windows 3.0 environment and interfaces with Oracle Corp.'s Oracle and Ashton-Tate Corp.'s Dbase IV relational database management systems as well as with Aldus Corp.'s Pagemaker page layout software. It automates the process of integrating database information into publishable report formats, the vendor said.

Pageahead costs $795.

Pageahead Software
Suite 300
2125 Western Ave.
Seattle, Wash. 98121
(206) 441-0340



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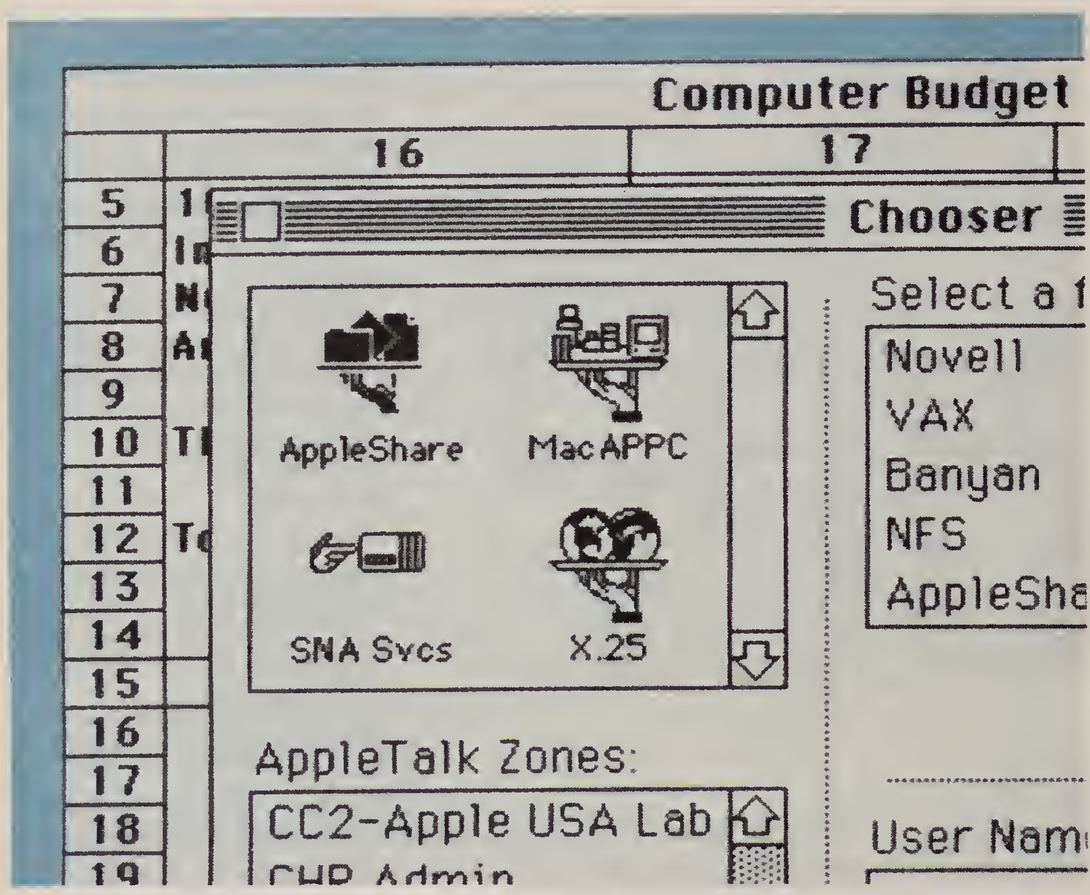

This is the Macintosh Chooser. A single point of access to a wide range of systems. The Chooser shows available network resources graphically and consistently. Just point the mouse and you're connected.

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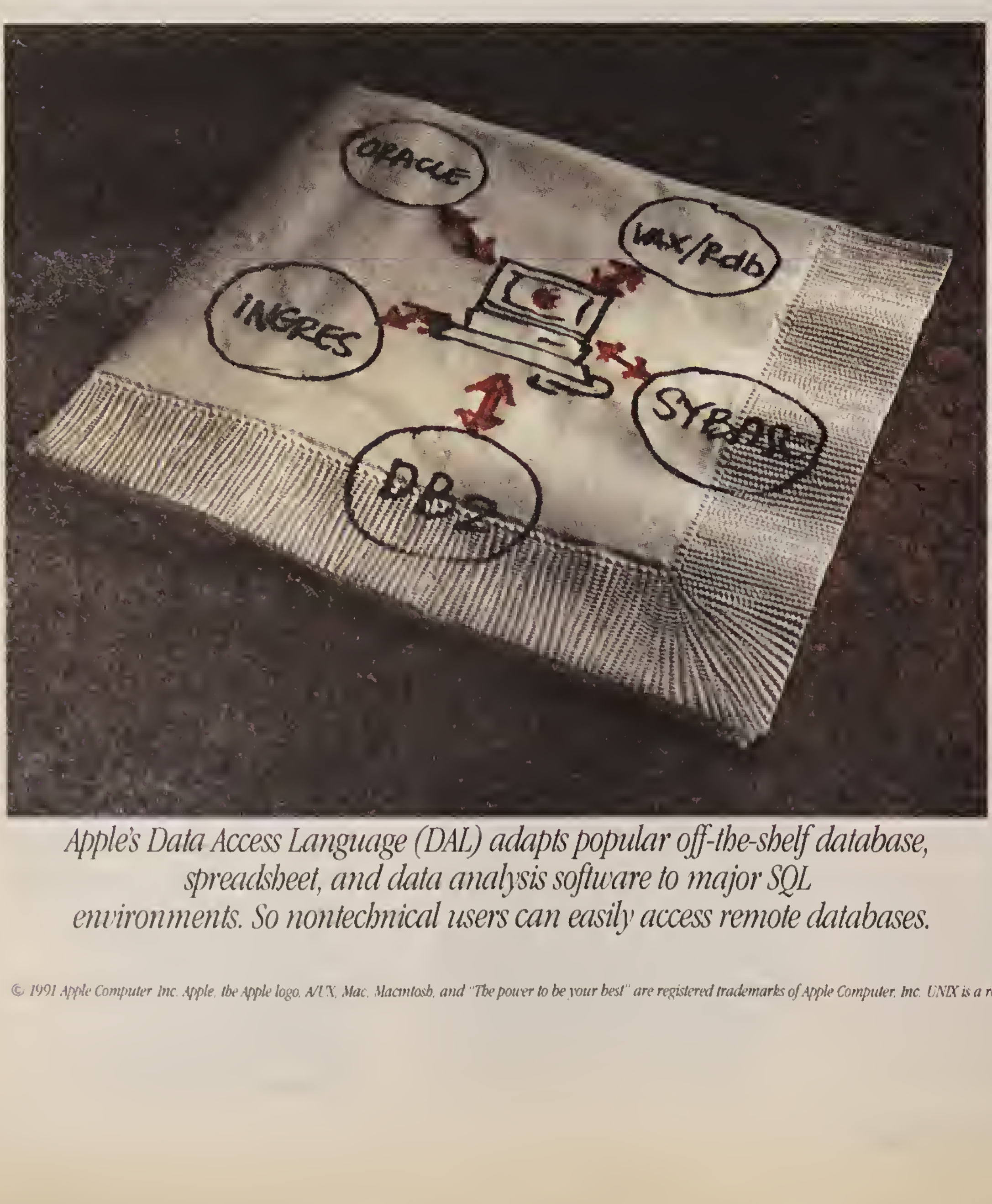
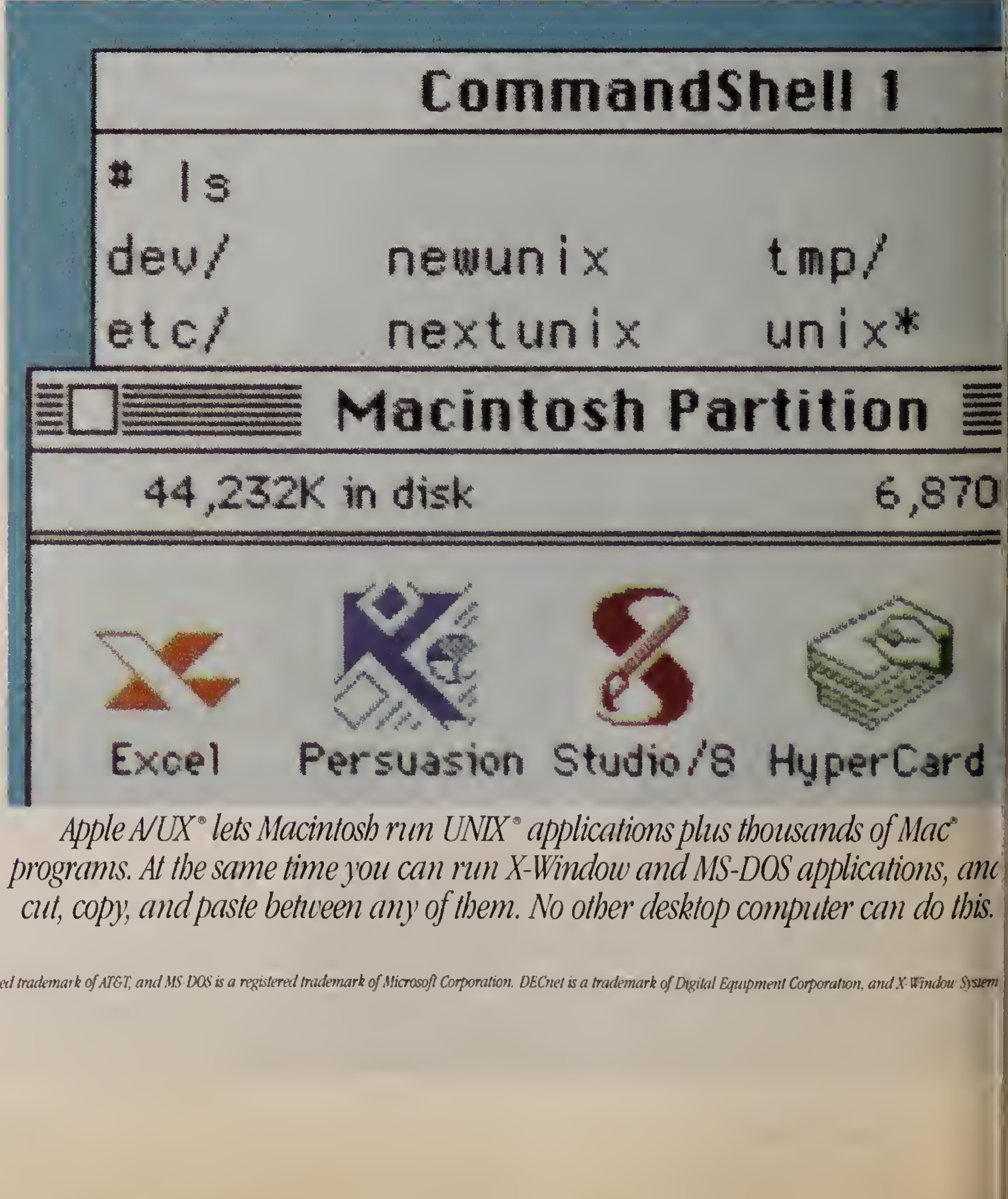


Apple's Data Access Language (DAL) adapts popular off-the-shelf database, spreadsheet, and data analysis software to major SQL environments. So nontechnical users can easily access remote databases.



```
# ls
dev/      newunix     tmp/
etc/      nextunix    unix*
```

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to anything.

Macintosh shares data with DOS PCs via Novell, 3Com, Banyan, and more. Macintosh reads and writes DOS files on a floppy disk. Macintosh runs DOS programs. Maybe your next DOS computer should be a Macintosh.

Information isn't much good to people who can't get to it. Macintosh sorts out the complexities of multiple computer systems and presents vast information to people at the desktop in a single, consistent way.

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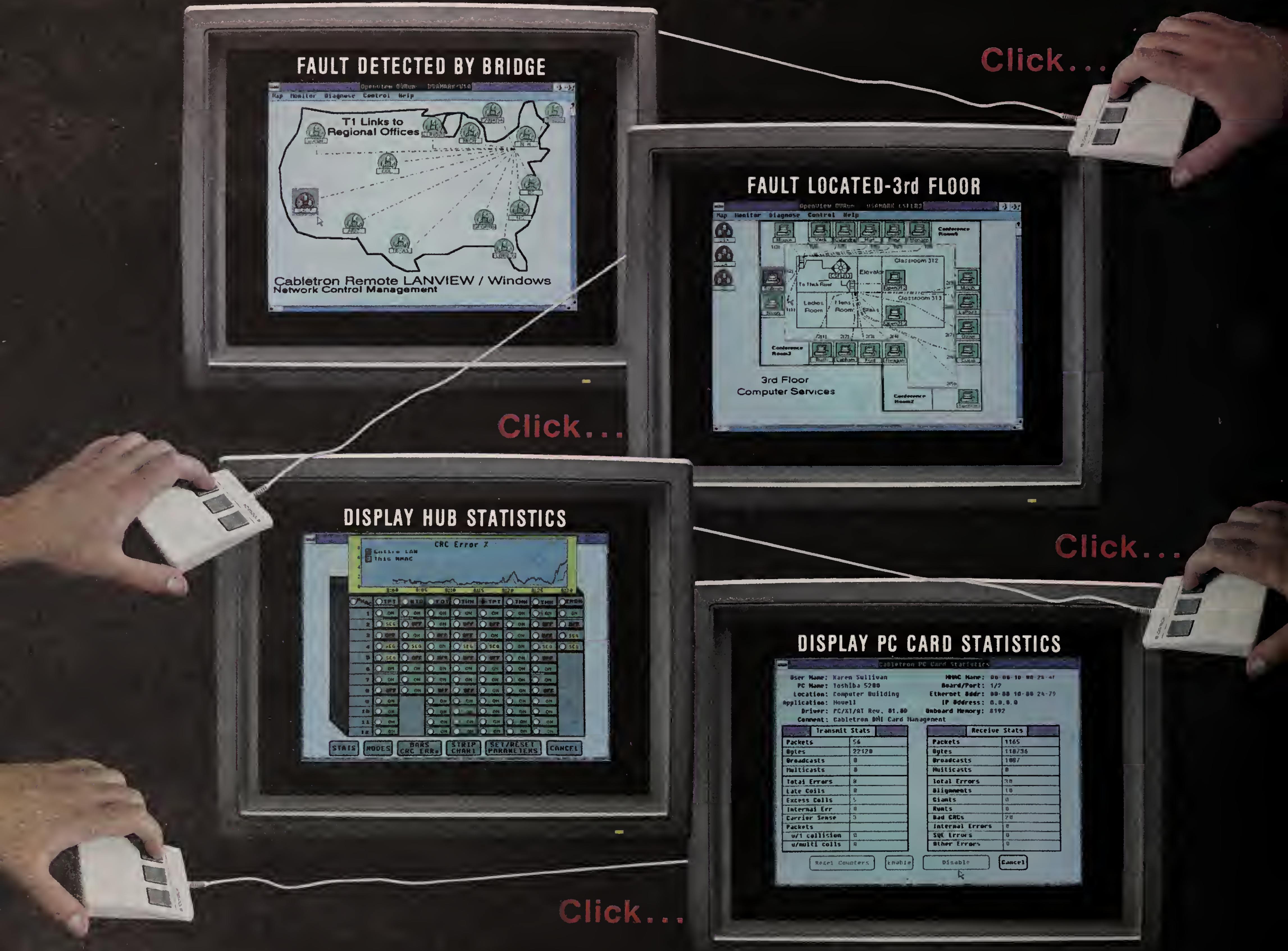

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011-44-635-580000

NETWORK SHORTS

Card costs changing

Token Ring network interface card maker **Madge Networks Ltd.** has raised the price of its Micro Channel Architecture-compatible adapter — switchable from 16M to 4M bit/sec. speeds — from $995 to $1,025 in single-unit quantities. The cards, as well as those for the IBM Personal Computer AT, are available in packages of 10 at a 10% discount, the company said.

The move came shortly before IBM slashed the price of its 4M bit/sec. adapter cards by 50%.

Meanwhile, **IQ Technologies, Inc.** has lowered the price of its 4M bit/sec. Token Ring adapter card from $950 to $845. It also recently announced a $995 16/4M bit/sec. switchable card. According to the company, the card works with most laptop, notebook and desktop PCs.

The price of **Hughes LAN Systems, Inc.**'s Prolinc desktop connectivity product has reportedly dropped by 31%: from $595 to $495 per single-user package and from $505 to $350 per 25-user package. Prolinc allows MS-DOS and Microsoft Corp. Windows 3.0 PCs to concurrently access multiple hosts, file servers and network operating systems, according to the company.

T1 demands more safeguards

Firms needing constant uptime use Clearview expert system

BY JOANIE M. WEXLER
CW STAFF

The tendency of T1 users to dump voice traffic back onto the public network and replace it with business-critical data is giving way to the need for tighter management tools to protect companies' quickly appreciating corporate backbones.

The trend to anchor business on corporate data networks that can tolerate virtually no downtime is apparent in some firms' recent decisions to install or expand monitoring of their T1 circuits and equipment with an artificial intelligence-based system from Clear Communications in Lincolnshire, Ill.

The vendor announced last week that telephone switch maker Northern Telecom, Inc. and GTE Data Services have installed its Clearview Surveillance System and that Mastercard International has expanded its use of the product nationwide.

The system runs on a Sun Microsystems, Inc. workstation and aims to pick up where diagnostics in multiplexer vendors' network management systems and channel service units (CSU) leave off. CSUs terminate a digital circuit, collect network performance data and provide alarms for follow-up action.

Before-the-fact protection

Clearview, on the other hand, provides real-time fault isolation and diagnostic tools to alert managers to degrading performance before the network falters. The after-the-fact reporting done by multiplexer vendors' proprietary network management systems and CSUs often do not offer enough nitty-gritty details for heading off lost data and network outages at the pass, some Clearview users said.

Mastercard said it has expanded its use of Clearview because Banknet, the company's network, "is the business," explained Steve Crider, director of network communications at Mastercard's operations facility in St. Louis.

Mastercard just bumped its number of Clearview-monitored T1 circuits from 80 to all 119 U.S. Banknet circuits connected via a Racal-Milgo T1 backbone.

Mastercard demands 99.99% Banknet availability, and Clearview serves as an "early-warning and real-time system" that resolves network problems before they happen, Crider said. It automatically and continuously pulls information from all T1 links, documents it and prints it in graphical form, he added.

Also important to Mastercard is that "when a [telecommunications]" carrier is out of compliance, we can call him on it and get a refund," Crider said. Clearview has twice tagged poor carrier performance resulting in potential carrier service paybacks to Mastercard, he added.

Northern Telecom is also using Clearview to ensure that its worldwide private T1 network does not miss a beat. "There is a gap in T1 [multiplexer] technology in the sophistication of tests you can run," explained Mike Hill, manager of network control for the Mississauga, Ontario-based data services arm of Northern Telecom. "You can get basic diagnostics such as bit-error rates, but you certainly can't get errored seconds and other information you need to isolate problems quickly."

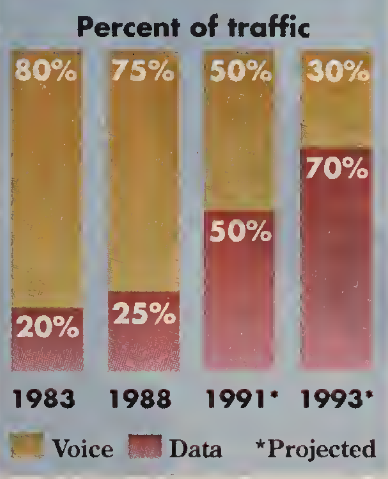
Hill boiled his goal down to: "I don't want to get a call from a VP because he's in the midst of a videoconference and the picture goes bad. To keep up with the exotic data demands we're running across our corporate networks, we need to resolve glitches quickly or we'll have a quagmire of problems."

Hill said his goal for network uptime is 99.8%, a charge made more complex by the 24-hour, global nature of Northern Telecom's network because there are no "off-hours" when the network is "closed." Also, the network comprises T1 multiplexers from vendors with different network management systems: Racal-Milgo, Timeplex, Inc. and Newbridge Networks, Inc.

Both Hill and Crider said they use multiple interexchange carriers, and Clearview provides an efficiency rating of each carrier and vendor — "something that would require hours of manual work on a PC database," Hill said. The function allows the companies to grab statistics and compare vendor report cards, allowing them to tell carriers and vendors to "get their acts together," Crider said.

T1 trends

Companies continue to pile data on their T1 networks, requiring more sophisticated management tools to ensure uptime



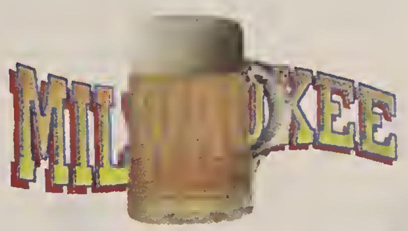
CW Chart: Doreen St. John
Source: Dataquest, Inc.

Reality means savings for Milwaukee

BY CHRISTOPHER LINDQUIST
CW STAFF

MILWAUKEE — The city of Milwaukee's purchasing department wanted to cut costs, turnaround time and inventory levels. The cure it decided to try was a dose of Reality.

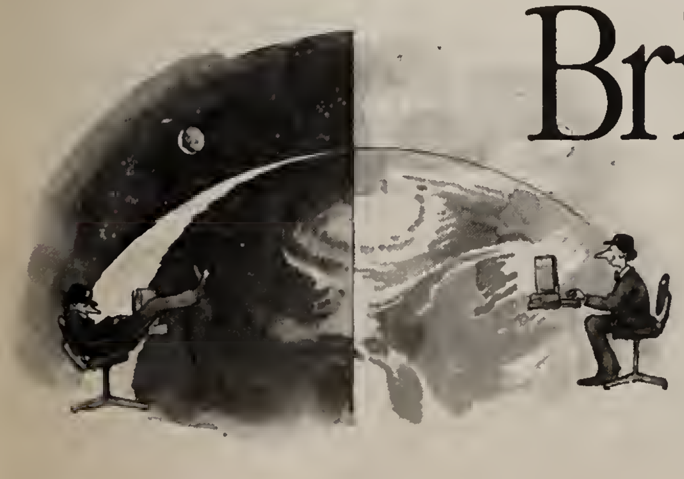
The city hopes that Reality, a local-area network-based purchasing software package from Structured Computer Systems, Inc. in Avon, Conn., will allow shorter lead times and more efficient operations than were previously possible.



Reality's combination of features made it very appealing to the city. It performs basic purchasing functions such as bid and purchase-order processing and is priced far below mainframe packages with similar features.

"I think as far as actual requirements go, [Reality] could match the mainframe systems," said Tom Hoeppner, automation services administrator for the city. The fact that it ran on a network was an added bonus, as the department had already planned on installing a LAN that would be

Continued on page 51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HEWLETT
PACKARD

Agency plans five-net integration

BY ELISABETH HORWITT
CW STAFF

QUEBEC — The Canadian Employment and Immigration Commission (CEIC) plans to take five networks that can barely talk to one another and mesh them into an organizationwide system that will support 12,000 terminals.

Under a $7.1 million, five-year contract signed last month, BT North America, Inc. will provide the CCITT X.25-compliant packet switches to put the network together.

CEIC is responsible for unemployment insurance, job listings and immigration management. Unisys Corp. mainframes at each of the five centers serve a group of user terminals and personal computer local-area networks. Interaction among the different centers is currently limited to file transfer that uses Burroughs Corp.'s Network Architecture, CEIC Director General Steve Connolly said.

The new network, CEInet, will provide a single, integrated communications system within the 25,000-person agency, Connolly said. CEIC "has all kinds of internal reasons to talk" across its disparate agency networks, including the need to collect data across the organization for internal finance and personnel systems, he added.

Use of X.25 packet switching will provide much more efficient utilization of CEIC's private network. This is an important point, given that the backbone covers an area roughly 4,500 miles long and 150 miles deep, according to Steve Kay, CEIC's director of data communications and office automation. X.25 "supports an easier mix of on-line terminals and file transfer and permits easier and lower cost sharing of the backbone," Kay said.

The industry standard will also keep CEIC independent of any one vendor's networking devices and will enable the organization to route flexibly around circuit failures, Connolly said.

Installation plans

CEIC will not migrate to X.25 immediately, however. During phase one, BT will install Turbo Engine 4800 switches to connect CEIC hubs in Montreal, Hull, Belleville and Toronto at speeds of 56K bit/sec. Eleven other cities will be equipped with BT PXL engines and linked over 9.6K or 19.2K bit/sec. lines. During this phase, CEIC will continue to run the proprietary Burroughs Poll Select protocol across the network without X.25, Connolly said. Phase one will connect 5,000 terminals.

During phase two, BT will provide software on the PXLs to translate Burroughs Poll Select to X.25, and 7,000 terminals will be added to the network.

One key application that will run on the network is an organizationwide electronic mail system. Right now, terminal users have a very limited form of E-mail on the host and no effective way to exchange messages outside of their regional networks. CEIC is now evaluating the CCITT X.400 standard as a possible basis for the E-mail network, Kay said.

CEIC is also standardizing its LAN installations on Banyan Systems, Inc.'s Virtual Networking Software, according to Connolly. While most sites now use Banyan, a few use other LAN products, such as Novell, Inc.'s Netware.

After competitive bidding by 10 vendors, CEIC chose BT because the company offered "the best type of solution at the lowest cost," Connolly said.

Telecom firms set standards for multinational networks

BY ELLIS BOOKER
CW STAFF

NEW YORK — AT&T and three foreign providers of telecommunications services said late last month they had settled on standards and procedures for offering coordinated, global private networks to large multinational customers.

The alliance between AT&T, British Telecom, France Telecom and Kokusai Denshin Denwa (KDD) of Japan was announced last November. The arrangement is aimed at creating a "one-stop shop" for multinational networking. Without such a service, multinationals face the often cumbersome task of dealing with each national telecommunications agency in turn.

Called the Joint Network Initiatives, the standards call for coordinated billing, network testing and a single point of contact, regardless of which company bears the territorial responsibility for any part of the network.

The initiatives cover the provision of telecommunications services; network hardware, including private branch exchanges, in some cases; project management; network design; equipment installation; and network management.

The partners claimed that harmonized testing and configuration procedures help to reduce network design time by as much as 50% and that customers will be assured of end-to-end service integrity.

The partners announced that Nippon Express Co., a large Japanese shipping firm, would be the first customer of the joint offering.

A spokesman for the group said the Nippon Express network will cover Japan, the U.S. and Europe; will include voice, fax, telex and data services; and will connect up to 13,000 telephone terminals in Japan.

Nippon spends approximately $219,000 per month on international calls placed from Japan. The firm said it hopes to save $102,000 per month under the coordinated service.

The initial cost to Nippon Express will be about $4 million, the spokesman said.

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Lansystems users expect Intel to be good to them

Improved technical support cited as a likely benefit of the small software firm's recent acquisition

BY JIM NASH
CW STAFF

Network managers see more pluses than minuses in Intel Corp.'s acquisition of Lansystems, Inc.'s networking software division. Intel's greater resources, at least in the short term, could aid in supporting Lansystems software.

Intel's acquisition of Lansystems' network products last month caused little more than a tremor among users of its network utilities. Lansystems software is largely based on Novell, Inc.'s network operating system, although some versions of certain products, such as its print server application, Lanspool, were based on Microsoft Corp.'s LAN Manager.

"In terms of support, I would assume things will be better" under Intel, said Victor Tam, a programmer at Continental Insurance Co. in New York.

Dennis Laplant, systems analyst at the Sarasota County, Fla., building and zoning department, said support from Lansystems has been good, but he expects it to become quicker under the much larger Intel.

Tam said he must work on the road with remote users and is sometimes frustrated by slow turnaround with smaller companies.

"When I'm out in the field, I can't call in for advice and just sit there for three hours waiting for a reply," he explained.

Tam said Intel may make the logical move and begin to combine its hardware products with Lansystems' applications.

For example, Intel could merge its Lanport, a device that hooks directly to a network port and acts as a dedicated print server, with Lanspool, a Lansystems application that allows users to designate a nearby workstation as a temporary print server, according to Tam.

That could be a negative for some managers, however, said Alex Resnick, president of systems integrator Practical Computer Corp. in Markham, Ontario. Resnick pointed out that companies now using Lansystems' software products may be left with dead end products if they are made into firmware.

Of the two vendors, said Michael Karfopoulos, an analyst at consulting firm Gartner Group, Inc. in Stamford, Conn., Lansystems stands to benefit most. Karfopoulos said there had been conflicts between the company's integration and manufacturing divisions.

Karfopoulos said company integrators have sometimes recommended software other than Lansystems'. He added that Intel will benefit most if it exploits the Novell connections it gains by picking up the product lines.

Reality

FROM PAGE 47

attached to other systems around the city.

Milwaukee has 16 servers that are interconnected by a fiber-optic backbone. Using Reality, the purchasing department will be able to perform requisitions and track orders across all of the interconnected networks from a central location. Hoeppner said interconnecting the systems will help reduce inventory levels by cutting lead times and making information more readily available.

In another bid for improved efficiency, a fax gateway has been connected to the LAN, allowing the department to eliminate some paper flow by electronically sending such things as bid documents to vendors.

The department has looked into electronic data interchange (EDI), but the sheer number of vendors the city deals with makes EDI a prospect for the far future, Hoeppner noted.

"We have, for example, about 8,000 bid vendors in our vendor bid file, so it's kind of difficult for us to target and get EDI relationships going with our vendors," he said. However, he added, "It is our vision down the line to be able to eliminate some of the documentation that flows back and forth."

Purchasing had been a manual process for the city, and the turnaround time from request to approval was 30 days or more, Hoeppner said. This lag time, combined with the lack of an efficient means of inventory management, resulted in inventory levels two to three times higher than those in cities of comparable size. "Our current level is somewhere around the $6 million mark; cities of our size are normally in the $2 million to $3 million level," Hoeppner said.

In response to this problem, the city last year issued a request for proposals (RFP) for a computerized purchasing system intended to cut lead times and provide a centralized way to manage both purchasing and inventory.

Performance, not platform, was the most important consideration, Hoeppner said. "We basically put out an RFP that said, 'We don't really care what kind of platform you run on; we're looking at the requirements for a purchasing system,' " he said.

After testing software for a variety of platforms from personal computers to mainframes, the city decided on the LAN-based Reality and signed a $158,000 contract for software with Structured Computer Systems.

The system is currently being installed, and Hoeppner said he hopes to begin pilot testing within about six months.

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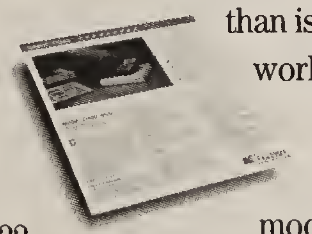

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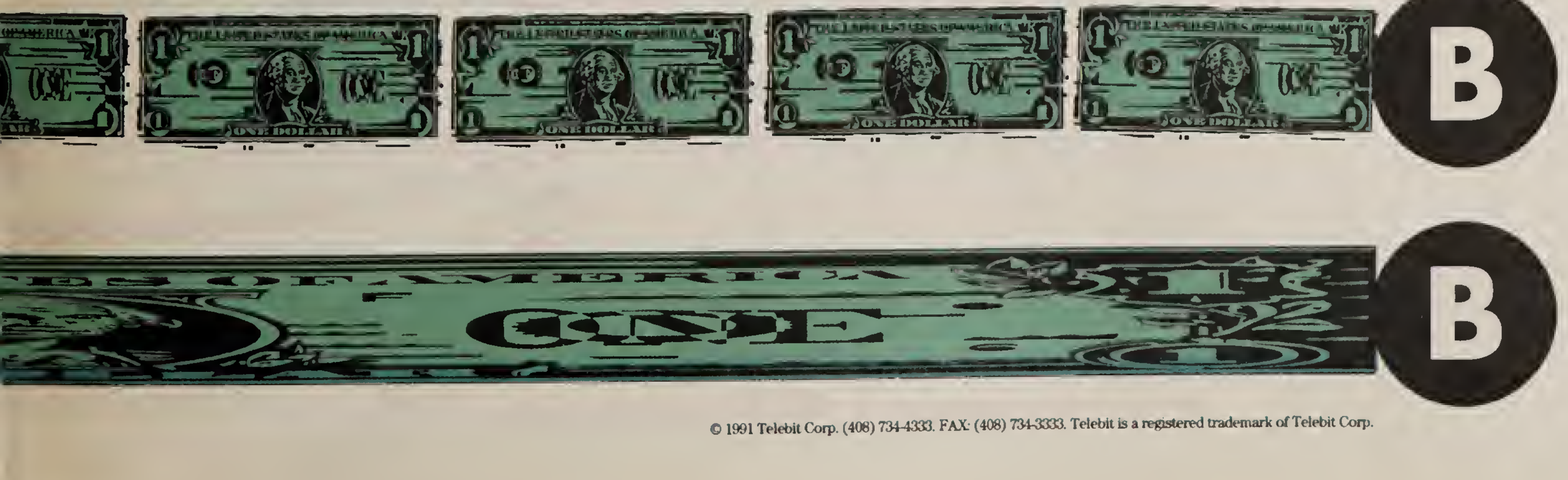

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NEW PRODUCTS

Local-area networking software

KEA Systems Ltd. has introduced KEAlink IPX, a software product that makes possible concurrent connections under Novell, Inc.'s Netware, Transmission Control Protocol/Internet Protocol (TCP/IP) and Digital Equipment Corp.'s Local Area Transport (LAT) protocol.

KEAlink IPX allows users to maintain connection with a Netware server while accessing data on multiple hosts that run LAT and TCP/IP. The product converts Netware communications to the Network Device Interface Standard, which offers simultaneous, multiprotocol communications.

The product costs $75.

KEA Systems
Unit 101
3738 N. Fraser Way
Burnaby, British Columbia V5J 5G1
(604) 431-0727

Network services

An off-site backup and retrieval service for personal computers and PC networks has been announced by Secure Data Network, Inc. (SDN).

SDN installs the Subscriber System 1000, a high-speed modem, in a subscriber's PC under DOS and Novell, Inc. network environments. The system automatically compresses, encrypts and transmits copies of files that have been altered since the most recent backup. Files are stored by a substation that transfers data to digital audiotapes and returns files to the user in the event of data loss. A central station provides daily backup for all substations and archives information permanently on optical discs in secure, remote locations.

Pricing for the service begins at $45 per month.

Secure Data Network
5777 W. Century Blvd.
Suite 1600
Los Angeles, Calif. 90045
(213) 641-1300

Electronic mail

Soft-Switch, Inc. has announced integration of fax and telex capabilities into its electronic mail gateway product line.

The Soft-Switch products can send messages to distribution lists encompassing a combination of fax, telex and E-mail contact information. Images and graphics may be incorporated into E-mail and fax transmissions.

The gateways are immediately available for the IVM/VM operating system. Pricing begins at $32,000 for the Enterprise Fax Gateway/VM and $30,000 for the Enterprise Telex Gateway/VM.

Soft-Switch
640 Lee Road
Wayne, Pa. 19087
(215) 640-9600

Gateways, bridges, routers

Lan-Link Corp. has announced an Ethernet bridge that communicates at 56K bit/sec. over analog lines.

The LCS-IIA connects remote Ethernet local-area networks over two-wire dial-up and four-wire dedicated analog lines. According to the company, the bridge works with all 802.3-compliant operating systems and is protocol-independent. An optional adapter card connects Token Ring and Arcnet LANs.

The LCS-IIA is priced at $7,500.

Lan-Link
744 Goddard Ave.
St. Louis, Mo. 63005
(314) 537-9800

Micro-to-host

Mozart Systems Corp. has added support for the Microsoft Corp. Windows 3.0 environment to its personal computer-based mainframe applications development software tool.

Mozart 3.0 develops graphical user interfaces for host applications running on PCs. Design features include object-oriented functions, a fourth-generation language, an interactive debugger and mapping facilities. Mozart is IBM Common User Access-compliant; it supports Transmission Control Protocol/Internet Protocol and IBM's LU2, 3270 and 5250 communications.

The development environment costs $7,000; runtime modules cost $500 or $175 each for more than 1,000 licenses.

Mozart Systems
Suite 630
1350 Bayshore Highway
Burlingame, Calif. 94010
(415) 340-1588

Network management

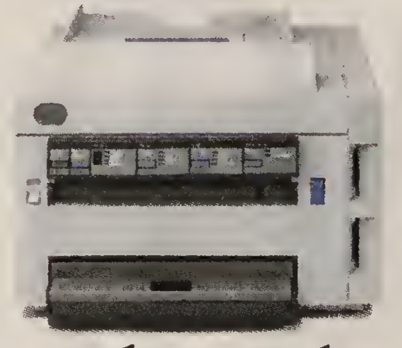
Digital Pathways, Inc. has announced Multi software for management of remote networked security devices.

Multi collects and analyzes audit trail data from the company's remote Securelink X.25 (SLX) and Digital Authentication Device (DAD) security devices. The product also manages remote databases via its script language.

A version of Multi that supports DAD costs $995. A version that supports DAD and SLX costs $4,000.

Digital Pathways
201 Ravendale Drive
Mountain View, Calif. 94043
(415) 964-0707

The IBM LaserPrinter.



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MANAGER'S JOURNAL

EXECUTIVE TRACK

Richard H. Serafin has been named vice president of information systems and chief information officer at **VWR Corp.**, a distributor of laboratory and chemical supplies in Media, Pa.

He was most recently director of business systems consulting in the Philadelphia office of Arthur Andersen & Co. Before that, he was director of quality assurance for Arthur Andersen's southeast region.

Before joining Arthur Andersen, Serafin was an information technology consulting partner with Arthur Young in Philadelphia and Richmond, Va.

……

Raymond L. Mobley has joined **American Express Information Services Corp.** as president of its new outsourcing services unit, Boston-based Integrated Systems Technologies.

The unit manages the combined IS operations of The Boston Co. and The Shareholder Services Group.

Mobley, 55, was most recently president and chief executive officer of Atek Information Services, Inc. He was founder and president of Business Systems Technologies, a financial industry consulting firm. Before that, he spent 19 years at Electronic Data Systems Corp.

……

Edward M. Pillard, formerly vice president of Salomon Brothers, Inc.'s Technology Services unit, was named vice president of the eastern region at **Network Management, Inc.** in Fairfax, Va. Pillard reports to Network Management President and CEO Francis A. Dramis, who also recently left Salomon's IS department.

……

Who's on the go?

When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld,* P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

IS turns chance into a science

Dependable, accurate systems are the ticket to a winning California State Lottery

BY JAMES DALY
CW STAFF

At the California State Lottery, the day will be forever remembered as Lotto Fever. The history books will be somewhat more clinical, reporting simply that on April 17 of this year, state lottery officials drew the largest jackpot in U.S. history: $118 million.

By early evening, tycoon wanna-bes were scoffing up 6.3 million tickets per hour. Limousines were double-parked at Lotto retailers in Beverly Hills while across the state, store owners reported hour-long waits for tickets, with lines snaking around corners and down blocks.

Just before 8 p.m., the lucky numbers were picked, and 10 winning ticketholders went shrieking off into the night, their futures changed forever. But for Joanne Ichimura-Hoffman, the lottery's director of information management and services, it was just another day — a weird, wonderful, computationally demanding day in which she played a pivotal role.

"You could say it was our finest hour," she says. "I'm very proud of that."

Ichimura-Hoffman commands the information systems of an operation so successful that its $2.48 billion annual revenue would rank 42nd in sales in the Fortune Diversified Service 100 and first in profitability. She has been a big part of that, having headed the lottery's IS department for the past four years.

Any lottery's success stems primarily from its reputation for honesty. The average Lotto player may buy a ticket and Cheez-Doodles, only to forget about the transaction two minutes later. Dependency translates into trust, and trust results in sales. "The lottery must perform without missing a beat," Ichimura-Hoffman says. "It's the only way our integrity will never be jeopardized."

Equal parts traffic cop, security expert and dispenser of dreams, she stitches together myriad tasks during days that may find her in her Sacramento office at 4 a.m., slumbering on a couch given to her by a boss who grew tired of finding her asleep on the floor. During her lengthy workday, she delights in sneaking away to indulge a perverse pleasure. "I love stress-testing the system," she says. "I like to have millions of transactions a second blasted through the system to see what happens, what it's capable of."

Ichimura-Hoffman's "no surprises" philosophy emanates from a childhood steeped in adversity. Born in a Japanese internment camp during World War II, she was shuffled around the

Continued on page 58

PROFILE: Joanne Ichimura-Hoffman

Andy Freeberg

Position: *Director of information management and services at the California State Lottery*
Mission: *Handling the IS needs of the lottery's 1,100 employees*

Survey uncovers resistance to outsourcing

BY CLINTON WILDER
CW STAFF

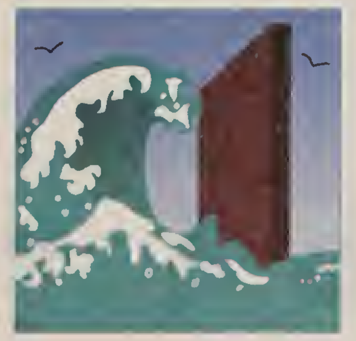
Despite all the hype, there is still considerable resistance to the outsourcing wave, according to a recent survey by Mountain View, Calif.-based Input, Inc.

The survey of information systems executives and managers at 55 Fortune 1,000 companies established that 75% of the companies have not even evaluated outsourcing as an option for their IS functions. Input defines outsourcing as farming out all or part of a company's IS operations for three years or more.

Even among the one-quarter of respondents who have looked at outsourcing, "a lot of them were nudged into it by declining economic conditions," said J. P. Richard, principal consultant at Input's Vienna, Va., office. "We expected about 50-50; 75% is a big number," he said.

The reason for such resistance is "they want to protect their own empires, and rightly so," Richard said. "But within the next five years, I think there will be a lot more pressure from financial executives to evaluate the option.

"Enlightened IS executives will do it, either to save money by outsourcing or to use the option as a baseball bat to reduce costs on their own staff. We have seen where that can be very effective," he said.



IS executives in the banking industry were among the most receptive to outsourcing, according to the survey, while the retail industry was the most resistant. "In retail, we ran into a lot of people who said, 'These [outsourcing vendors] don't understand our business; it's unique,' " Richard said.

Input continues to predict fairly healthy growth for the outsourcing market. However, the firm estimates a 17% annual increase from $7.4 billion in 1990 to $15.9 billion in 1995. Richard is optimistic that current IS management resistance will be overcome in the next few years. The resistance "just dampens what could be an *extremely* healthy growth rate," he said.

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EN ADVANTAGE.

Ichimura-Hoffman

CONTINUED FROM PAGE 55

country several times. Her most vivid memory is of years spent in the dark and isolated camps. "I remember sitting on a curb in Kansas City soon after we were released, and I was just fascinated by the neon signs. I had never seen so many lights," she recalls.

That fascination with blinking lights returned at California State University in Sacramento when she began using computers while studying for a chemistry degree. Later, she combined her analytical and chemistry skills to establish a criminalistics laboratory information system.

In addition to handling the IS needs of the lottery's 1,100 employees, Ichimura-Hoffman maintains the trust of millions of lottery players. A system that handles more than 20 million transactions daily must perform as effortlessly as a kitchen toaster, or the whole process is undermined. "We're not perfect — but we can always try," she says. Her ultimate goal: "A zero-defect, quality product that performs at highly stressed levels."

Unlike other state agencies, the lottery is a fund-raising organization. Approximately 34 cents from each $1 Lotto ticket go to the California public school system. Since the lottery's inception in late 1985, it has raised more than $4 billion for public schools.

Team player

Ichimura-Hoffman's management style stems from a philosophy of managers as an interworking team, able to share many chores within a department or process. "Joanne is constantly challenging us so we stay fresh, and we're never afraid of getting stuck in a rut," says Lou Mucci, chief of gaming systems for the lottery.

There are plenty of challenges for the 200 employees in the lottery's $55 million IS department. Nearly 10,000 lottery terminals peppered throughout the state continually inject information into a data site at Sacramento in the north or Whittier in the south. Even this relatively simple process comes under Ichimura-Hoffman's edict of "no surprises." Network bridges drop any terminal location that may be adversely affecting other retailers on the shared circuit until the problem is resolved. Switching equipment can also reroute transmissions to a backup facility.

Each site contains two Concurrent Computer Corp. 3280s, one serving as the primary machine and the other as its backup. The backup maintains a record of every transaction received by the primary system so it can take over in the event of a failure. Each primary computer transmits all of its data to the primary computer at the other data center.

Co-workers praise Ichimura-Hoffman's decision to use multiple 3280s because they allow the blossoming operation to expand easily. "You just continue to attach more processors and increase your throughput," Mucci says. "Its possibilities are unlimited."

The expandability is critical for a system so dependent on record-taking. Each ticket contains a serial number that records where, when and in what order it was purchased. This information stockpile typically approaches 100 million per week and is kept for the six months during which winners can redeem their tickets.

Ichimura-Hoffman enlists the aid of an outside vendor for the formidable task of running the on-line operations. Lotto games, which are updated regularly, are developed jointly with Providence, R.I.-based Gtech Corp. The lottery staffers deliver all the design specifications to Gtech, which codes the software. Gtech also handles software development work and data center operations and repairs terminals in the field.

The end user — the Lotto ticket buyer — sees little in this complex arrangement except computational efficiency. Prizes of $25 or less are verified and awarded nearly instantaneously at the retailer outlets, even when the systems are dealing with processing bursts as unpredictable as human nature itself. After the final out of one World Series game, for instance, sports fans flooded out of their homes to buy lottery tickets. "It was horrendous, but we hung in there," Ichimura-Hoffman says.

One area Ichimura-Hoffman obsesses about is security, an absolutely crucial component to the trustworthiness of each drawing. All on-line terminals include audit trails, and each terminal is uniquely identified to the computer, ensuring that the terminal accepts only data meant for it and that the central computer accepts data only from a known lottery terminal. Data is encrypted for sending.

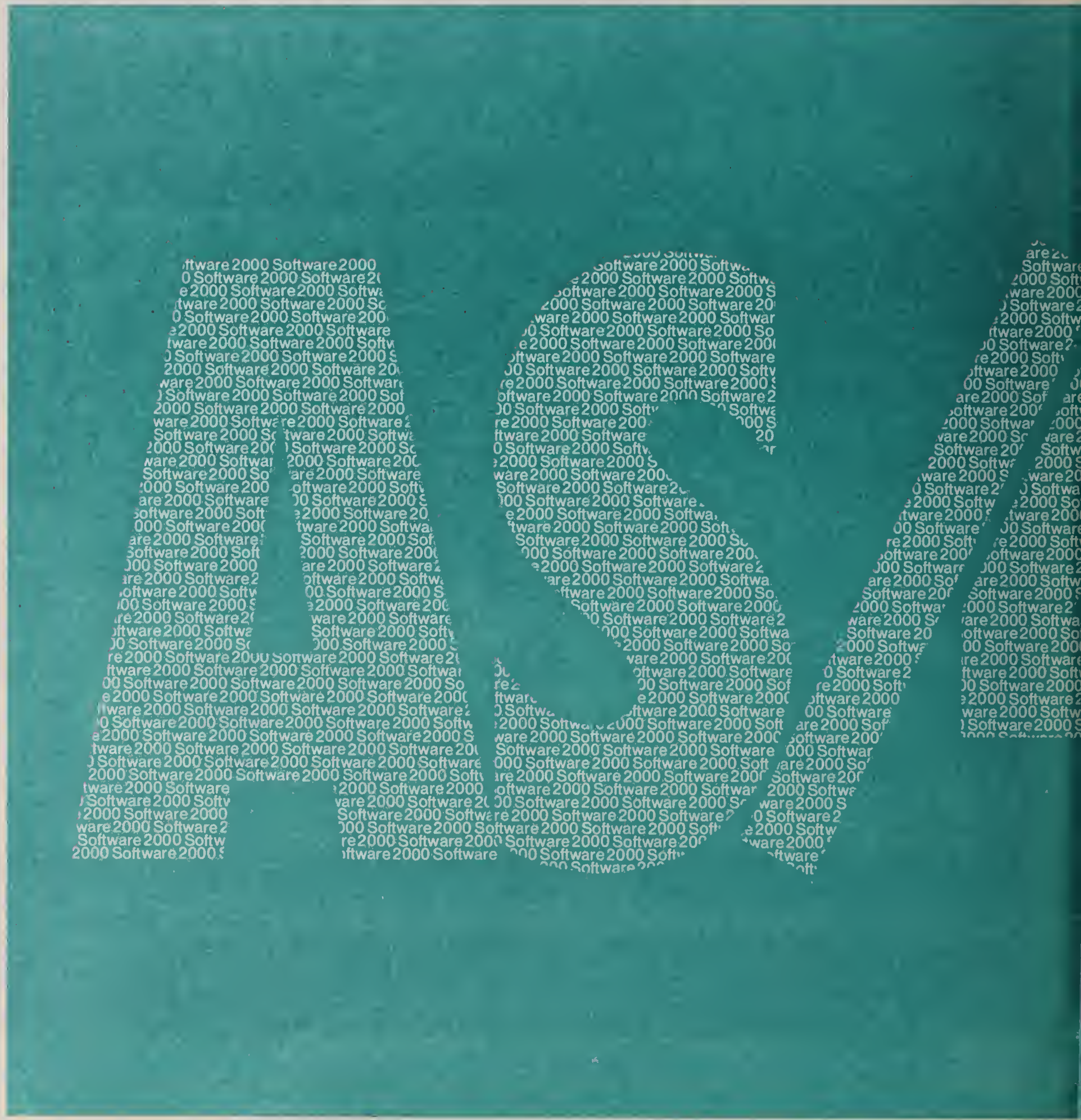
The draw machines and balls used in the twice-weekly Lotto drawings are measured and weighed regularly to ensure uniformity before being trotted off to a secured safe room. New staffers are carefully screened, and access to lottery headquarters is closely monitored.

Ichimura-Hoffman likes to know what's going on at firms that are critical to the success of the lottery. The firm that supplies the ticket stock, for example, was informed that it had better be ready to spring if a retailer's supply was low. Both AT&T and MCI Communications Corp. were given stern warnings during the record-breaking drawing.

"We don't even want them near our circuits," she says. "We told all the electricians not to come back until another week has passed; we don't want them to do anything with the wiring. We don't want air conditioners fixed unless they're in the computer room. We freeze all software, all testing."

No surprises.

The Closer You Look At Distribution Software For



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CALENDAR

"Insourcing vs. Oursourcing: Innovation Without Headcount," The Yankee Group's second annual conference on outsourcing, will be held July 30-31 at the Westin Resort in Hilton Head, S.C.

Speakers from user companies include Fred Cisewski, senior vice president at Bank South NA, and Al Jones, director of information systems at Kelsey-Hayes. Vendor speakers include Mel Bergstein of Computer Sciences Corp. and Howard Frank of Network Management, Inc.

For more information or to register, contact Betsy Gray, The Yankee Group, Boston, Mass. (617) 367-1000.

JULY 7-13

International Conference and Exhibits on Failure Analysis. Montreal, July 8-11 — Contact: ASM Member/Customer Service Center, ASM International, Materials Park, Ohio (216) 338-5151.

Structured Development Forum. Portland, Ore., July 8-11 — Contact: Software Association of Oregon, Beaverton, Ore. (503) 690-1395.

National ISDN — Working Together to Make it Happen. Washington, D.C., July 9-10 — Contact: Barbara Kaufman, Bellcore, Livingston, N.J. (201) 740-4324.

Engineering Workstations Conference. Boston, July 9-11 — Contact: EWC, Santa Monica, Calif. (213) 450-0500.

Geographic Information and Spatial Data Exposition. Washington, D.C., July 9-12 — Contact: Gisdex, Silver Spring, Md. (301) 445-4400.

Sony Government Technology Exposition. Washington, D.C., July 10-11 — Contact: Sony Business and Professional Group, Montvale, N.J. (800) 877-7669.

APICS 1991 Total Manufacturing Performance Seminar. San Diego, July 10-12 — Contact: APICS Meeting Registration, Falls Church, Va. (703) 237-8344.

JULY 14-20

Guide 80. Boston, July 14-19 — Contact: Guide Headquarters, Chicago, Ill. (312) 644-6610.

American Association for Artificial Intelligence National Conference on Artificial Intelligence. Anaheim, Calif., July 14-19 — Contact: AAAI-91, Menlo Park, Calif. (415) 328-3123.

TQM '91 Conference. Washington, D.C., July 15-17 — Contact: Paula Harrington, Society of Manufacturing Engineers, Dearborn, Mich. (313) 271-0777.

Communication Networks West Conference and Exposition (Comnet West). San Francisco, July 15-18 — Contact: IDG Conference Management Group, Framingham, Mass. (508) 879-6700.

Video Expo. Chicago, July 15-19 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Computer Technology and Military Planning Symposium and Exhibition. Arlington, Va., July 16-18 — Contact: Automated Missions Planning Society, Palmyra, N.J. (609) 829-7823.

Information Engineering/RAD. Washington, D.C., July 16-18 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8306.

International Conference for Young Computer Scientists (ICYCS '91). Beijing, China, July 18-20 — Contact: Yongchun Liu, Cad Laboratory, Academia Sinica, Beijing, China. Fax: (011 86 1) 2567724 or 2568152.

JULY 21-27

IPO Quarterly Meeting. Pittsburgh, July 21-26 — Contact: National Computer Graphics Association, Fairfax, Va. (703) 698-9600.

Remittance and Document Processing Forum and Exposition. Anaheim, Calif., July 21-24 — Contact: Recognition Technologies Users Association, Boston, Mass. (617) 426-1167.

IRM '91. Beaver Creek, Colo., July 22-24 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

Mactivity '91: The Macintosh Connectivity Conference. Santa Clara, Calif., July 23-25 — Contact: Winehouse Computer Co., Los Gatos, Calif. (408) 345-2500.

Software World. Toronto, July 23-25 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-0526.

Artificial Intelligence and the Help Desk. San Francisco, July 23-26 — Contact: Help Desk Professionals, Colorado Springs, Colo. (719) 531-5138.

JULY 28-AUGUST 3

International Management Graphics User's Group Meeting. Las Vegas, Aug. 1-4 — Contact: MGI, Minneapolis, Minn. (612) 854-1220.

AUGUST 4-10

Raima Technologies Conference. Seattle, Aug. 4-7 — Contact: Andy Rebele, The Westwater Group, Boulder, Colo. (303) 440-3410.

Software Maintenance and Re-engineering. Washington, D.C., Aug. 5-9 — Contact: U.S. Professional Development Institute, Silver Spring, Md. (301) 445-4400.

CASE World. Boston, Aug. 6-8 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-0526.

Landex '91. San Francisco, Aug. 8-10 — Contact: Local Area Network Dealers Association, Elmhurst, Ill. (708) 279-2255.

AUGUST 11-17

Information and Technology: Gateway to Solutions. San Francisco, Aug. 11-15 — Contact: URISA, Washington, D.C. (202) 289-1685.

Manufacturing Networks Conference. Chicago, Aug. 12-13 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Electronic Data Interchange for Government. Washington, D.C., Aug. 12-15 — Contact: U.S. Professional Development Institute, Silver Spring, Md. (301) 445-4400.

The National Conference on Computing. New Haven, Conn., Aug. 12-16 — Contact: The Research Center on Computing and Society, Southern Connecticut State University, New Haven, Conn. (203) 397-4423.

Windows and OS/2. Boston, Aug. 14-16 — Contact: CM Ventures, Emeryville, Calif. (415) 601-5000.

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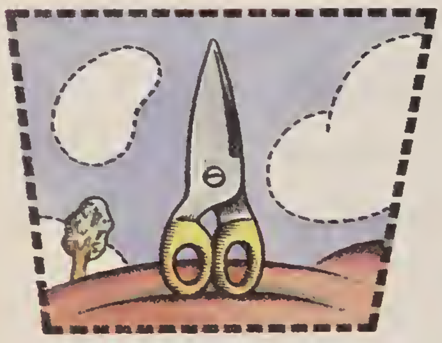


Tim Lewis

Summaries from leading scientific and management journals

"A diagnostic approach to information management problems in the organization"

By Richard J. Palmer, Martin W. Tucker and James B. King II

Journal of Systems Management
May 1991

■ The information systems manager can improve the overall efficiency and effectiveness of IS by identifying areas for improvement through the development, distribution and analysis of a user satisfaction survey.

In order for IS managers to maintain an information system that will satisfy present and future needs of management, the following guidelines must be adhered to:

- Begin with a philosophical commitment to customer service. The products IS departments provide to users should create high customer satisfaction.
- Manage the information base proactively by taking steps to ensure that customers receive what they need in a timely manner and are not given what they don't need. Surveys can often be valuable tools in determining whether the needs of the users are being efficiently and effectively satisfied.
- Anticipate the future information needs of customers. An IS manager can be successful by meeting customers' current needs. However, to remain successful, managers must be able to foresee users' future needs and keep the user informed of the progress made toward meeting those needs. — *Kelly E. Dwyer*

"Teaching smart people how to learn"

By Chris Argyris

Harvard Business Review
May-June 1991

■ There is a learning disability affecting corporations today: Many highly educated, high-profile professionals — including IS managers — are having a hard time learning on the job.

Their success in education is precisely the reason they have difficulty learning. Their educational records speak to their success and to the fact that they have almost never seen failure.

To correct this weakness, managers must realize that learning is not just problem solving: It also involves reasoning. Behaviorial changes might be in order so that managers can obtain their highest level of success. Managers need to be taught that failure is a part of the learning process. Accepting failure, rather than trying to shift the blame for it onto other employees, is the key to successful learning. — *Stefanie McCann*

"Client/server architecture promises radical changes"

By Grey Freeman and Jerry York

Cause/Effect
Spring 1991

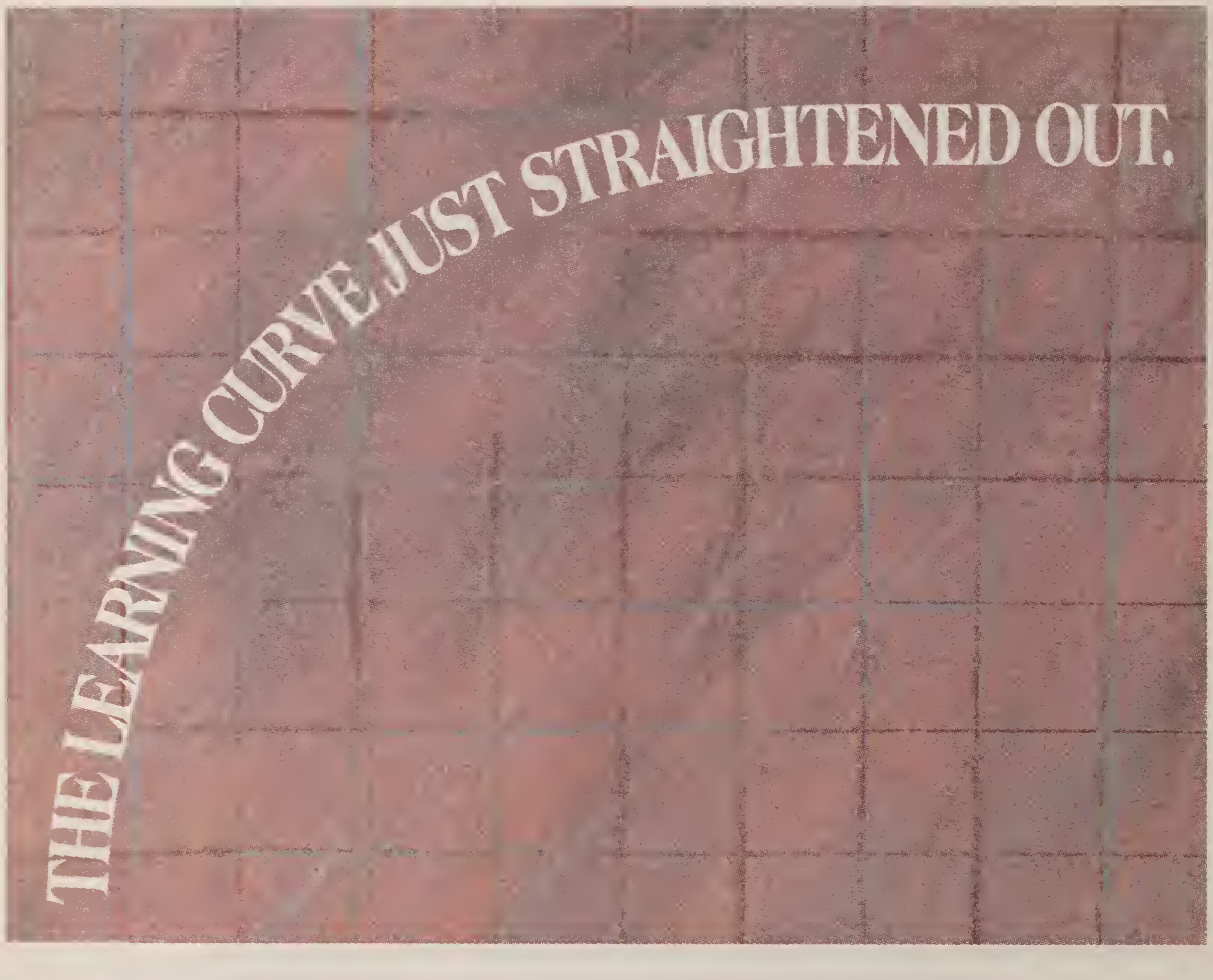
■ By the mid-1990s, client/server architecture is expected to be in widespread use among Fortune 500 companies. But before it can be widely adopted, some transitions will be necessary.

While users working from their personal computers or workstations on a network have for years been able to access other platforms and tiers through local-area and wide-area networks, doing so involves a patchworked system. The client/server model takes accessibility many steps further and makes the process easier.

Basically, the client/server architecture gives the PC user a consistent user interface to access a variety of resources from different vendors and architectures connected through networks. The user may not know or care which vendor's platform is being accessed, the hardware and software characteristics of that platform, the commands necessary for the access or how that access request is routed through the network. The PC is used to gain access when the user makes a request. When the user's "client" system requests access to a computing resource, his PC or workstation will either handle the request itself, if capable, or pass the request through the network to an appropriate "server."

The problem is that hardware technologies to make the client/server concept viable are available, but software technology and standards for the architecture have not yet fully emerged.

To plan for the emergence of client/server architecture, companies and institutions will need to adopt new technologies, develop new applications design and development methodologies and restructure their IS organizations. — *Alan J. Ryan*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The object-action applications architecture of CSP/ADE delivers a complete set of reusable applications models to the CSP development platform.

This enables a developer new to CSP to produce quality applications because the technical structures for CUA/CPI-compliant CSP applications are already supplied in CSP/ADE. The developer is able to concentrate on business issues.

And this direct approach to applications development takes a lot of the curve out of learning.

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PRODUCT SPOTLIGHT

Teaching minis new tricks

Necessary changes lie ahead, but midrange machines are proving they can be the right machine for a server job

BY JIM HAMMONS

Amid all of the client/server fanfare, there are two groups of people decidedly not swayed by the idea of using personal computers or workstations as the server component in such a setup: vendors of minicomputers and owners of minicomputers who would rather take advantage of what they already have.

Take Lee Bockhorst, manager of technical research at Central Area Data Processing Cooperative near St. Louis, which manages systems and services for a group of rural utility companies in the Midwest.

Bockhorst used connectivity software provided by Unisys Corp. and existing communications lines to turn the cooperative's Unisys U6000 minicomputers into servers. All in all, he says, it was a relatively smooth transition.

"We sort of grew into it over time as users wanted more access to data from their PCs and LANs," Bockhorst says. "It's what we've had installed, and there's no sense moving from it now."

In a time of restricted budgets, the ability to find an additional use for existing minicomputer resources is extremely attractive. With the help of the original vendor, companies are finding they can avoid the purchase of an additional server — even a low-cost PC server — and put more resources into software and connectivity.

The question is: Is the minicomputer actually a better choice than the smaller machines as a local-area network server? Is it ever a good idea to purchase one instead of a PC or workstation?

According to Business Research Group, a market research firm in Newton, Mass., a significant number of users think so. In a recent study, 31% of 100 information systems managers surveyed said they plan to purchase minicomputers as LAN servers in the future.

Certainly, the minicomputer vendors would like you to think so. All of the major players are now making a concerted effort to reposition and reconfigure their traditional terminal-to-host minicomputers as very powerful servers for the burgeoning networks their customers are installing.

The newer machines, such as Digital Equipment Corp.'s VAX 4000 and Hewlett-Packard Co.'s latest 3000 and 9000 systems, have significantly improved I/O performance and can be configured with server software and PC connectivity options direct from the manufacturer.

In addition, these systems do not require a multiuser license or some of the components typically needed to support a traditional minicomputer installation.

Debbie Palen

At the same time, PCs undoubtedly hold quite a few more trump cards than their larger predecessors, even these sleeker models. PCs are easier to install, increasingly able to handle critical applications and less expensive, both to purchase and to maintain. However, minicomputers may still be worth more than just a second look.

For instance, vendors such as DEC and HP are working to make the minicomputer environment — which is notoriously difficult in terms of configuration and maintenance — more familiar to PC users.

Minicomputers are also better able to accommodate growth than even an Intel Corp.-based I486 PC server.

Superservers from Compaq Computer Corp., Netframe Systems, Inc. and Parallan Computer, Inc. are addressing growth and storage limitations of PC servers, but minicomputers ultimately offer higher top-end growth.

With superservers, you also run the risk of locking yourself into a local-area rather than a corporatewide configuration. This is because minicomputers are better and more experienced at wide-area connectivity.

Other strengths of server-configured machines include the following:

- Strong systems management.
- Support of existing multiuser applications.
- High levels of service and maintenance (see story page 68).
- Better fault tolerance.

However, while fault tolerance and offerings such as systems management are all well and good, they are proprietary solutions, and people seriously considering minicomputers as servers need to look beyond the proprietary world to connectivity with PCs and LANs.

It is here, in the area of

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INSIDE

Falling Resale Zone
Many factors have newer minis dropping in value. Page 64.

At Your Service
Service ain't what it used to be: It's a whole lot better. Page 68.

Product Guide
A comprehensive listing of late-model miniservers. Page 69.

Hammons is an independent consultant in Mesa, Ariz., and was formerly an analyst at The Sierra Group, Inc.

Consider a minicomputer server if the following are true:

- The application runs on a minicomputer now and is not in need of extensive modifications.
- The application requires a lot of disk space or memory.
- The application cannot tolerate downtime.
- You need wide-area communications and interfaces with larger networks.
- You have broadly distributed applications, or your organization requires more support or fast response to problems.

You may not need a minicomputer if the following are true:

- The application -- even a database system -- is natively implemented on a DOS platform and does not require extremely large amounts of disk storage.
- You have no in-house expertise in using midrange systems.

CW Chart: Janell Genovese

Continued from page 63

connectivity with existing PC protocols, that minicomputer vendors will have to become more innovative. HP, for one, has been quietly upgrading its proprietary database, Allbase, to accommodate standard SQL database calls.

"This will allow nearly all the PC SQL products to work with the HP minis as database servers," says William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Dave Heck, communications engineer for the city of Tempe, Ariz., and a current user, says he hopes to try the new database. The city government has approximately 21 HP 3000 systems installed — too big an investment to just throw away. "We plan to convert about 60% to 70% of those 3000 systems to SQL database servers, probably using Allbase," Heck says.

Another step minicomputer vendors are taking to integrate new miniservers with existing LANs is to support network operating systems such as Novell, Inc.'s Netware and Microsoft Corp.'s LAN Manager.

Novell's Portable Netware runs on DEC's VMS operating system and Unix. In addition, HP, Wang Laboratories, Inc. and Data General Corp. each have licenses to the network operating system, which they have ported to their own operating systems. Microsoft's LAN Manager has been ported to run on most Unix systems.

Slow going

While support of these network operating systems allows the minicomputer to act as a network file and print server while concurrently supporting other network functions such as server-based database applications, it can also make the minicomputer quite sluggish: In many cases, the network operating system is implemented on top of the minicomputer's native environment.

A much larger roadblock to minicomputer popularity is its higher price.

Several vendors are working to bring the cost of their entry-level miniservers down to more competitive levels, but they are still more costly than even more advanced PC servers such as the Compaq Systempro.

Minicomputers offer much higher potential value on the secondary market. Even though resale values are declining (see story below), they are still much more attractive to lessors than PC-based systems, including superservers.

For one thing, says Tony Coppola, president of Computer Products Marketing in Laguna Niguel, Calif., residual values at the end of the lease for PC-based servers are typically very small.

In addition, lessors would rather have customers renew a lease — a common practice in the minicomputer world — than try to remarket a PC server at the end of a lease. They are particularly skittish about establishing any resale value at all for the multiprocessing superservers because those companies have no track record.

Third, Coppola says, "minicomputers can be remarketed as a server or as a minicomputer. It gives the user a better deal in the end."

In other words, because the lessor has two ways to resell a used minicomputer, the potential value at the end of the lease is higher. With this higher residual value, users can negotiate lower lease payments over the term of the lease.

Beyond justifying the cost, the most difficult short-term problem minicomputers contend with is the lack of innovative new software that implements true client/server functionality.

PC vendors actually have the same difficulty in finding applications that allow a server and a workstation to process different parts of the same application at the same time. But because minicomputer vendors see this as their proving ground, they tend to feel the burden more acutely.

Proving ground

What many minicomputer vendors are waiting for are standards to emerge in wide-area networking, such as the Open Software Foundation's Distributed Computing Environment.

Because such standards would support common procedure calls and application programming interfaces across a network, they would allow developers and users to create applications using computing resources and data from across the enterprise.

Such standards would do much for the minicomputer vendors' advantage over PC server vendors, especially when you consider their previous experience in wide-area communications and the fact that most minicomputer operating systems, including Unix, support multithreaded commands.

Midrange vendors may be aggressively pursuing the server market, but PC vendors are certainly not standing still. Many are adding fault-tolerant capabilities, network management features and increased storage to their systems.

As Bluestein suggests, many of the advantages miniservers currently enjoy will not last, especially if vendors don't move quickly to improve their support of PC and LAN protocols.

Still, the strength of the installed base and the experience of the minicomputer vendors should not be underestimated. In particular, those IS organizations familiar and comfortable with midrange systems will find it a relatively easy transition into using those systems as servers on their networks. •

Watch out for plummeting residuals

BY KARLYN KILROY and
TONY MEMBRINO

Caution: Falling resale values ahead.

There seems to be no end to their plummet. Compared with the 1980s, today's minicomputer product life cycles are shorter, price/performance improvements are more frequent and aggressive, and vendor discounts are steeper.

Price/performance improvements especially have a devastating effect on the value of older — and sometimes not so old — machines. For example, the 3-year-old VAX 6000-310 is trading for 33% retail, whereas it took nine years for the VAX 11/780 to drop to 28% retail.

Recent research indicates the IBM Application System/400 9406 B30 — less than three years old — is trading for approximately 41% retail. An IBM System/38 Model 8 traded for 60% retail during the same period of its life cycle.

Lower resale values can be good news for buyers, but they can be bad news as well. It is difficult to get the expected value for the system when it comes time to sell it. There is still bargaining room, however, especially with minicomputers emerging in server roles (see story above).

Minicomputer vendors today will probably get even more aggressive with price/performance improvements and marketing incentives.

In fact, the proliferation of personal computer local-area networks and open systems is placing even more pressure on midrange firms to offer competitively priced feature-rich products more frequently. •

Market value

Vendor	Model	Current list price	Current fair market value $	Percent of retail	As of this date
DEC	VAX 6000-310	$193,305	$87,000 $72,000	45% 37%	Feb. '91 April/May '91
	VAX 8550	$427,560	$48,000 $52,000	11% 12%	April/May '91 Feb. '91
	Microvax 3600	$104,600	$34,000	33%	March '91
Data General Corp.	MV/15000-8	$62,500	$10,000	16%	April '91
Hewlett-Packard Co.	3000-70	$185,000	$20,000	11%	March/April '91
Wang Laboratories, Inc.	VS 65	$35,200	$2,000	6%	Feb. '91
	VS 7150	$212,600	$48,000	23%	Feb. '91
IBM	Application System/400 9404-B10	$21,060	$11,600 $10,700	55% 47%	Jan. '91 April '91
	9406-B30	$29,790	$20,900 $16,400	70% 55%	Jan. '91 April '91
	9406-B45	$70,280	$54,800 $41,500	78% 59%	Jan. '91 April '91
	System/36 5360-B24	Current list $64,950	$9,100 $5,800	14% 9%	Jan. '91 April '91
	5360-D2K	Current list $80,030	$29,600 $26,000	37% 32%	Jan. '91 April '91

Fair market value of System/38 processors was not established during 1991 due to minimal trading

Source: Technology Investment Strategies Corp.

CW Chart: Doreen St. John

Kilroy and Membrino are analysts at Technology Investment Strategies Corp., a market research firm in Framingham, Mass.

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To each vendor, its own server strategy

BY JIM HAMMONS

Each minicomputer vendor has taken a different tack in ramping up its server offerings. What follows are synopses of each.

IBM

IBM announced connectivity software for its Application System/400 in April; it was then that the company first dared to call any machine in its minicomputer line a server.

The announced software, PC Support for the AS/400, implements IBM's own Advanced Program-to-Program Communications protocol, but it does not natively support the most common personal computer networking protocols, such as Novell, Inc.'s Netware and Microsoft Corp.'s LAN Manager.

The AS/400 is also limited in its ability to interface with other servers, according to some analysts. In addition, it still has only a proprietary database, although many third-party developers are developing client/server applications for it. The AS/400 does offer excellent connectivity with IBM host systems.

DEC

Digital Equipment Corp. has received positive reviews for its efforts to integrate PCs into its overall office strategy and for its connectivity to IBM mainframes.

DEC's recent cooperation with Apple Computer, Inc. has also produced some of the best Macintosh integration products on the market.

However, DEC remains committed to its own Decnet protocols, although the company does provide support for LAN Manager, and analysts say they expect the company to support Netware on the VAX soon.

On the software side, DEC is still heavily promoting its own RDB database product but shows some signs of working with other vendors to improve third-party database support.

DEC also intends to significantly improve the ease of installation for its server products.

Hewlett-Packard

Hewlett-Packard Co. has done well on the communications front, supporting both Netware and LAN Manager on its HP 3000 and HP 9000 systems. It also connects well with IBM host systems. Its ability to integrate with other servers on a network is very strong because of the company's early commitment to Transmission Control Protocol/Internet Protocol (TCP/IP).

HP's New Wave software provides some of the most impressive client/server capabilities in the industry. HP has also been a leader in opening its proprietary database to other front-end products and in recruiting

Continued on page 74

Take two

One of the most important things to remember is that you do not have to use minicomputer- or PC-based servers exclusively.

Applications in most organizations are diverse enough that both types of servers may be justified in different situations.

For example, you may use miniservers for all network-based transaction processing applications and PC servers for smaller work group applications.

These networks could all be tied together on the same enterprisewide communications backbone.

What this means for minicomputer vendors is that they're no longer the only game in town. "The mini will be just another system on the network," says William Bluestein, an analyst at Forrester Research, Inc..

JIM HAMMONS

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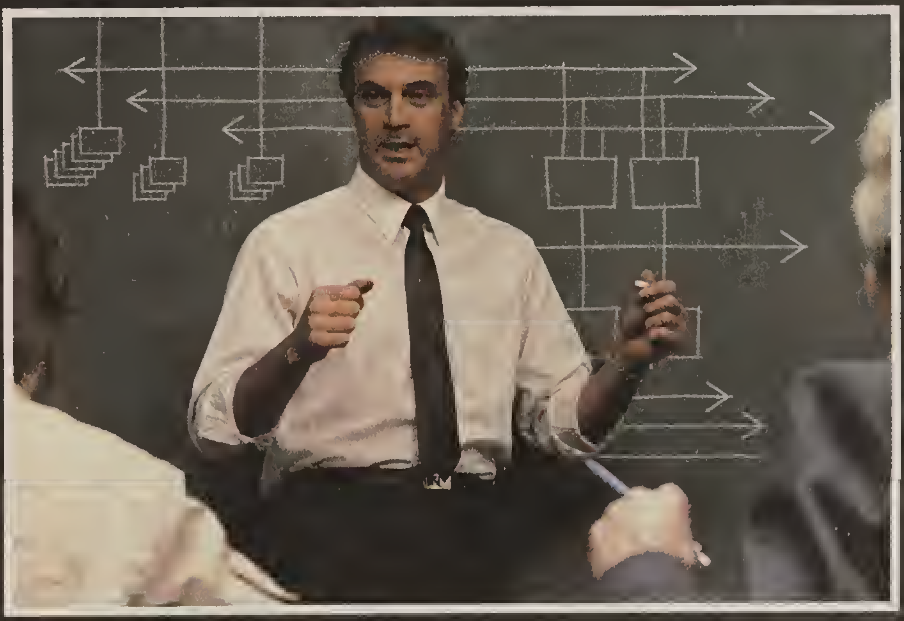

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Service options on the rise

BY LORI KLEINMAN

When you look over your options for minicomputer support and service, don't be surprised if the list has gotten lengthier and the offerings more complex than they used to be.

Especially with minicomputers taking on new roles in many organizations, minicomputer vendors are expanding their service portfolios beyond remedial maintenance to include multivendor and network support and are customizing and adapting technologies to meet customers' business needs.

With this new emphasis on service, users will need to get accustomed to a new way of pricing. Service used to be thrown in with the product purchase as a sales negotiating tool; more and more, service and support is being charged separately.

What follows are the support offerings from the major systems vendors:

IBM

During the past few years, IBM has concentrated primarily on simplifying its service contracts. Last month, however, it introduced value-added services through its newly organized Integrated Systems Solutions Corp.

The company's Professional Services and Education/Training Groups of the Applications Solutions Division, announced last fall, also offer enhanced services.

Network integration is still offered through custom bids, however, rather than packaged support offerings.

IBM has yet to expand End-User Services — help desk support for its own and multivendor personal computers — to minicomputers, but as the minicomputer's server role increases, the company may have to consider that.

DEC

Digital Equipment Corp. is one of the few vendors to support distributed systems with its VAX and Microvax service portfolio. It offers full support on the primary server system — including rights for designated people to call the support centers directly — and "economy" support on connected systems.

With its Vendor Application Services, DEC is well ahead of its competitors in providing third-party software support for midrange applications.

DEC has also gotten a jump on configuration service, which is being overlooked by other vendors. For example, DEC will configure and set up 1,000 or more PCs connected to a server for a large account.

Like IBM, DEC may need to consider adapting some of its desktop services for PCs and workstations to provide help desk support to other VAX platforms.

Hewlett-Packard

Hewlett-Packard Co. offers separate, tiered hardware and software support portfolios for its HP 3000 minicomputer product line, allowing customers to choose the level of support appropriate for their environments.

New services

The following trends have emerged as vendors attempt to address customers' minicomputer support needs more fully:

- Greater supply of value-added services.
- Integrated hardware and software service contracts.
- Increased availability of multivendor support.
- Differing levels of support for the server and nodes.
- Comprehensive network support offerings.

The company may expand its integrated hardware/software/network support to its minicomputer products, although it is currently available only for its workstation product line.

HP does offer network support under its Consultline services, which are priced separately from the traditional hardware and software support contracts.

NCR

NCR Corp. recently developed nine specialized "centers of expertise": systems integration, software engineering, account support, product, education, customer support, logistics, industry (vertical market focus) and business management.

These are essentially specialized organizations with the staff and resources to deliver highly customized, nontraditional services.

NCR also offers a well-rounded portfolio of network integration services.

Unisys and Prime

Unisys Corp. and Prime Computer, Inc. each have recently announced reorganizations that separate value-added services from traditional remedial maintenance business units. •

Kleinman is manager of software support at Ledgeway/Dataquest, a market research firm in Lexington, Mass.

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AT&T Computer Systems, Inc. (800) 247-1212	System 7000 series Models 7020, 7040, 7080, 7080 R2	DEC VAX 6000, IBM RS/6000, HP 9000 Series 800	12/100 nsec	Unix System V and BSD; (LAN Manager for Unix)	DOS, OS/2, Unix	All, including Informix, Ingres, Oracle, Sybase	208.5 trans./sec. running Informix	14 - 168	32M - 512M/1M per CPU	15G - 85G/NP	SNA, TCP/IP, X.25, SDLC, BSC, HASP, Data Kit VCS	Ethernet	Posix	$88,000 - $245,000 with 1 - 12 CPUs, 512M-byte memory, 128G-byte disk
	Starserver FT	Sequoia Series 300, Stratus XA2000	3 physical, 1 logical/ 16.67 MHz	Unix System V Release 3.1.1; (LAN Manager for Unix)	Unix	Informix, Ingres, Oracle, Sybase	9.35 Specmarks; 30 trans./sec. internal	11 - 15.6	16M - 192M/64K instruction cache, 64K data cache	27G/1.2M	SNA, TCP/IP, X.25	Ethernet	Unix System V Interface Definition	$129,000 - $361,000 with 3 physical and 1 logical CPUs, 16M- to 128M-byte memory, 600M to 1.2G-byte disk; $1,200 for operating system
	3B2/1000 Model 70, Model 80	NCR Tower, IBM AS/400	4/22 MHz, 24 MHz	Unix System V Release 3.2; (LAN Manager for Unix)	DOS, OS/2, Unix	Informix, Ingres, Oracle, Sybase, Unify	NP	5 - 16	16M (Model 70), 32M (Model 80) - 64M/4K, 8K	16G (internal), 1.2G (external)/5M	SNA, TCP/IP, X.25, SDLC, BSC, Data Kit VCS	Ethernet	Posix, Unix System V	$44,900 - $74,900 with 3 physical and 1 logical CPUs, up to 64M-byte memory, 16G-byte disk
Bull HN Information Systems, Inc. (508) 294-6000	DPX/2 Model 150 ETS	AT&T Starserver, NCR 3445	1/33 MHz	SCO Unix or Open Desktop; (LAN Manager for Unix)	DOS, OS/2, Unix	Informix, Oracle SCO Directory package	10.4 Specmarks	15	8M - 64M/128K	2.4G/4.8M	TCP/IP	Ethernet	Posix, X/Open CAE, FIPS	$15,000+ with 1 CPU, 8M-byte memory, 338M-byte disk, LAN, monitor, 128K cache, operating system
	DPX/2 Model 210, Model 220	NCR Tower 32 Model 300 and compatibles	1/25 MHz	Bull Open Software; (LAN Manager for Unix, NFS)	DOS, OS/2, Unix	Informix, Oracle Progress, Sybase, Unify	NP	5.2	4M - 52M/64K	3G/Up to 4M	OSI, TCP/IP	Ethernet	Posix, XPG3+	$12,000+ (Model 210), $17,000+ (Model 220) with 1 CPU, 4M-byte memory, 155M-byte disk, streamer, console, operating system
	DPX/2 Model 250	IBM RS/6000 Model 320, Unisys S/4040	1/25 MHz	Bull Open Software; (LAN Manager for Unix, NFS)	DOS, OS/2, Unix	Informix, Oracle Progress, Sybase, Unify	9.8 TPC/A; 9.5 Specmarks	12 - 15	4M - 52M/256K	3G/Up to 4M	OSI, TCP/IP	Ethernet	Posix, XPG3+	$17,000+ with 1 CPU, 4M-byte memory, 155M-byte disk, streamer, console, operating system
	DPX/2 Model 320, DPX/2 Model 340	IBM RS/6000, HP 9000, NCR 32	2/25 MHz, 4/33 MHz (Model 340)	Bull Open Software; (LAN Manager for Unix, NFS)	DOS, OS/2, Unix	Informix, Oracle Progress, Sybase, Unify	8 TPC/A trans./sec. (1 CPU) (Model 340)	6 - 12, 7.5 - 30	8M - 72M/64M per CPU	11G, 23G/Up to 4M	OSI, TCP/IP	Ethernet	Posix, XPG3+	$18,300+, $20,300 with 1 CPU, 8M-byte memory, 155M-byte disk, streamer, console, 64K cache, operating system
	DPX/2 Model 360	IBM RS/6000, NCR 3000, Sequent 2000, Wyse 9000	4/25 MHz	Bull Open Software; (LAN Manager for Unix, NFS)	DOS, OS/2, Unix	Informix, Oracle, Progress, Sybase, Unify	14.123 TPC/A trans./sec. (1 CPU), 22.74 TPC/B trans./sec. (1 CPU); 8.9 Specmarks	15 - 60	16M - 144M/64M per CPU	Up to 23G/Up to 4M	OSI, TCP/IP	Ethernet	Posix, XPG3+	$28,655+ with 1 CPU, 16M-byte memory, 338M-byte disk, streamer, console, 64K cache, operating system
	DPX/2 Model 510	IBM RS/6000, RS/6000 Model 550	1/60 MHz	Bull Open Software/RISC; (NFS)	DOS, OS/2, Unix	Informix, Oracle Progress, Sybase, Unify	44 Specmarks	68 VAX	32M - 512M/64K	675M - 40G/Up to 4M	TCP/IP	Ethernet	Posix, XPG3+	$140,000+ with 1 CPU, 32M-byte memory, 675M- 40G-byte disk, SCSI controller board, 572K multilevel cache, 150M-byte tape
	DPS 6000 Models 200, 500, 600	DEC VAX 6000, IBM AS/400	2 - 5/210, 200, 140 nsec	GCOS 6 HVS, GCOS 6 HVS ISC Unix, HVS, Unix; (LAN Manager for Unix)	Unix	Informix, IFS, IDS-II, Oracle	77.8 (25 MHz); 11.6 (33 MHz) Specmarks	1.7, 5.7 10	4M - 64M/16K - 192K	3.6G - 38.4G/1.2M - 3M	OSI	Ethernet	ISC Unix	$12,500, $38,500, $79,700 with 1 - 2 CPUs, 2M to 16M-byte memory, 68M to 290M-byte disk
Concurrent Computer Corp. (908) 758-7000	RT/Server Model 6000	NP	2/33 MHz	RTU Real Time Unix; (Portable Netware)	DOS, OS/2, Unix, Macintosh, Sun, HP	Informix, Ingres	NP	14	16M - 120M/NP	NP	IPX/SPX, Decnet, OSI, SNA, TCP/IP	Ethernet, Token Ring	Unix System V	$48,000 with 2 CPUs, 16M-byte memory, 663M-byte disk, 150M-byte tape, operating system, NFS
	RT/Server Model 7000	NP	3/25 MHz	RTU Real Time Unix; (Portable Netware)	DOS, OS/2, Unix, Macintosh, Sun, HP	Informix, Ingres	NP	40 - 60	16M - 120M/NP	NP	IPX/SPX, Decnet, OSI, SNA, TCP/IP	Ethernet, Token Ring	Unix System V	$32,700 with 2 CPUs, 16M-byte memory, 663M-byte disk, 525M-byte tape, operating system, NFS
	RT/Server Model 8000	NP	8/33 MHz	RTU Real Time Unix; (Portable Netware)	DOS, OS/2, Unix, Macintosh, Sun, HP	Informix, Ingres	NP	56 - 244	16M- 256M/NP	NP	IPX/SPX, Decnet, OSI, SNA, TCP/IP	Ethernet, Token Ring	Unix System V	$99,900 with 2 CPUs, 16M-byte memory, 663M-byte disk, 525M-byte tape, operating system, NFS
Control Data Corp. (612) 853-5445	4330	NP	1/25 MHz and 33 MHz	EP/IX; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase, Basis Plus	25.1 Specmarks	40	8M - 128M/64K	6.2G/NP	IPX/SPX, Decnet, SNA, TCP/IP, OSI, Cdcnet	Ethernet, Token Ring, FDDI	Posix	$10,640 - $80,000 with 8M-byte memory, 1 CPU, 400M-byte disk capacity, Ethernet
	4350	NP	1/33 MHz	EP/IX; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase, Basis Plus	31.5 Specmarks	41	16M - 128M/128K	11G/NP	IPX/SPX, Decnet, SNA, TCP/IP, OSI, Cdcnet	Ethernet	Posix	$35,350 - $150,000 with 1 CPU, 16M-byte memory, 663M-byte disk
	4360-300	NP	1/33 MHz	EP/IX; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase, Basis Plus	32.1 Specmarks	41	32M - 256M/128K	147G/NP	IPX/SPX, Decnet, SNA, TCP/IP, OSI, Cdcnet	Ethernet, FDDI	Posix	$60,550 - $200,000 with 1 CPU, 32M-byte memory, 663M-byte disk
	4680	NP	1/60 MHz	EP/IX; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybasem Basis Plus	55.7 Specmarks	68	32M - 384M/592K	179G/NP	IPX/SPX, Decnet, SNA, TCP/IP, OSI, Cdcnet	Ethernet, FDDI	Posix	$126,550 - $500,000 with 1 CPU, 32M-byte memory, 663M-byte disk, channel, QIC tape drive, Ethernet
	Cyber 920A, 920C	Silicon Graphics, Inc. 4D300S series, 4D400S series	8/33 MHz - 40 MHz	IRIX; (LAN Manager for Unix)	Unix	Informix, Oracle Sybase	19.5 - 159 Specmarks	30 - 286	8M - 256M/64K, instruction cache, 64K data cache, 256K data cache per CPU	380M - 47.5G/6M (IPI), 2.4M (SCSI)	Decnet, SNA, TCP/IP, FDDI	Ethernet	Posix	$24,900 - $164,900 with 1 - 8 CPUs, 8M-byte memory, 380M to 47.5G-byte disk, operating system
Data General Corp. (508) 366-8911 (800) 328-2436	Eclipse MV/3500 DC	DEC Microvax 3300, IBM AS/400 C-20	1/15 MHz	AOS/VS II, AOS/VS, DG/RDOS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	DG/Ingres, DG/SQL, Infos II, Oracle	4,640 DS (Version 2.1); 4,200 single; 2,490 double precision whetstones	3	8M - 24M/2K internal	6G/4M synchronous, 2M asynchronous	OSI, SNA, TCP/IP	Ethernet	SCSI bus	$19,900+ with 1 CPU, 4M-byte memory, 179M-byte disk, Comprehensive Electronic Office software, operating system

All products or models listed became available after December 1989; all listings are traditional minicomputers positioned as servers. [1] Per-second performance ratings, based on the following industry-standard benchmarks: DS — Dhrystones, Version 1.1, unless Version 2.1 is noted; DC — Debit/Credit (transactions based on 95% subsecond response); LP — Linpack (100 X 100 full-precision MFLOPS); LL — Livermore Loops (harmonic mean; 14 loops); TPC/A — the first benchmark implementation of the Transaction Processing Council. Vendors supplied actual or estimated benchmark figures. [2] MIPS — Millions of instructions per second. [3] VUP — VAX Units of Performance, a measurement used by DEC in which one VUP equals the performance of the VAX-11/780. [4] MAI Systems Corp. measures performance by the number of concurrent users that can be supported by a given machine. The GPX 5070 supports up to 160 users; the GPX 6070 supports up to 360 users.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

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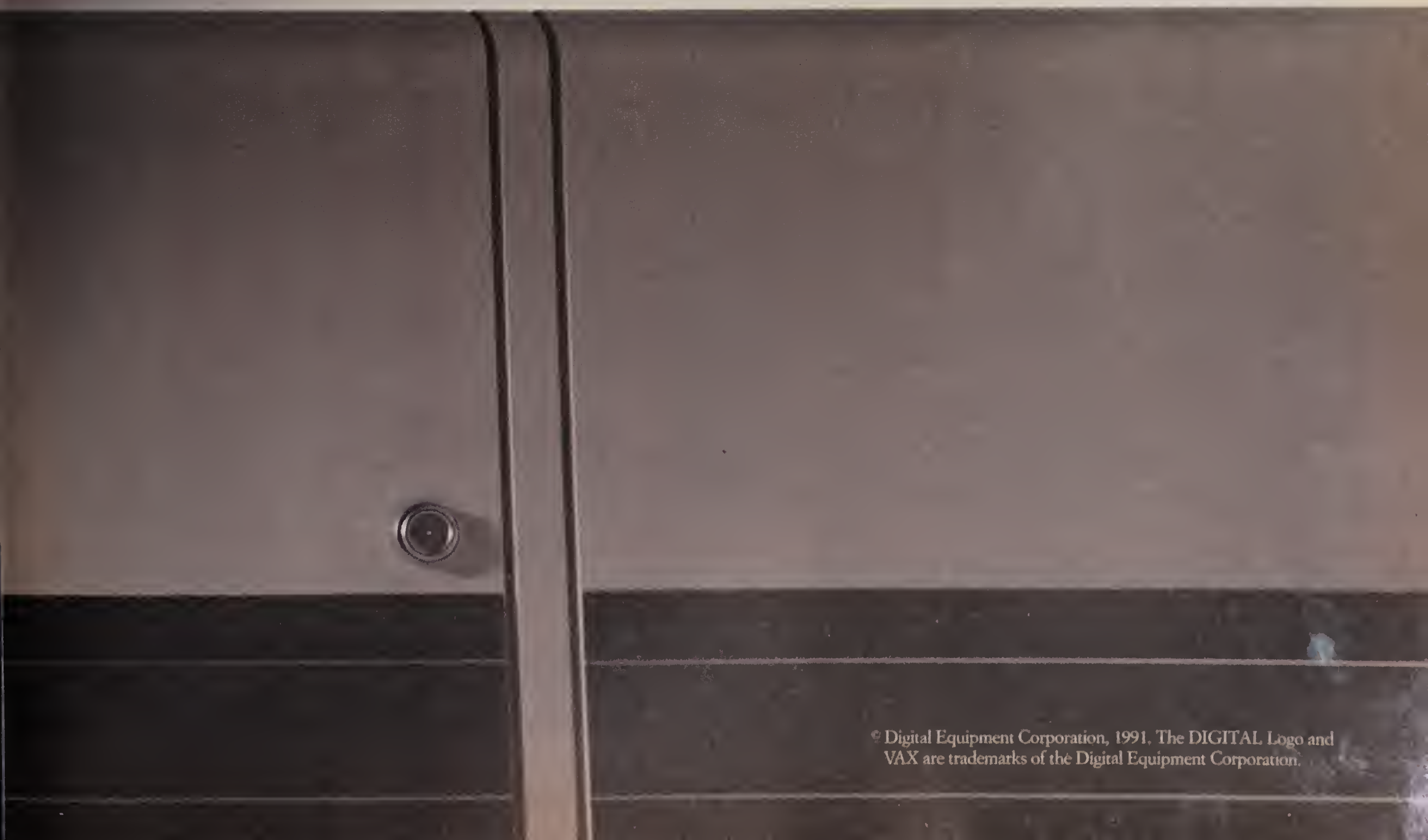

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VENDOR	PRODUCT	COMPARABLE SYSTEMS	MAXIMUM NUMBER OF CPUs/MACHINE CYCLE TIME (MHz)	HOST COMPUTER OPERATING SYSTEM; (NETWORK OPERATING SYSTEM)	CLIENT(S) SUPPORTED	DATABASE(S) SUPPORTED	BENCHMARKS[1]	PERFORMANCE IN MIPS[2]	MEMORY RANGE (BYTES)/CACHE CAPACITY (BYTES)	DISK CAPACITY (BYTES)/DISK TRANSFER RATE (BYTE/SEC)	LAN PROTOCOLS SUPPORTED	SUPPORTS ETHERNET OR TOKEN RING	OPEN SYSTEMS STANDARD SUPPORTED	PRICE RANGE WITH CONFIGURATION
Data General (Cont.)	Eclipse MV/5500 DC	DEC Microvax 4000 Model 200, Microvax 3800, HP Series 922, IBM AS/400 D35, NCR Tower series	1/15 MHz	AOS/VS II, AOS/VS, DG/RDOS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	DG/Ingres, DG/SQL, Infos II, Oracle	7,090 DS (Version 2.1); 4,622 single; 2,821 double precision whetstones	5	16M - 32M/64K external, 2K internal	6G/4M synchronous, 2M asynchronous	OSI, SNA, TCP/IP	Ethernet, Token Ring	SCSI bus	$53,100+ with 1 CPU, 16M-byte memory, 322M-byte disk, Comprehensive Electronic Office software, operating system
	Eclipse MV/9500	DEC VAX 4000 Models 200, 300, IBM AS/400 D35, D45	1/15 MHz	AOS/VS II, AOS/VS, AOS/RT32, DG/RDOS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	DG/Ingres, DG/SQL, Infos II, Oracle	7,112 DS (Version 2.1); 4,681 single; 2,839 double precision whetstones	5	8M - 128M/64K external, 2K internal	77G/5M	OSI, SNA, TCP/IP, XODIAC	Ethernet, Token Ring	SCSI bus	$62,000+ with 1 CPU, 8M-byte memory, Comprehensive Electronic Office software, operating system
	Eclipse MV/30000	DEC VAX 6000 Model 400 series, IBM AS/400 D50, D60, D70	4/15 MHz	AOS/VS II; (Portable Netware)	DOS, OS/2, Unix, Macintosh	DG/Ingres, DG/SQL, Infos II, Oracle	7,112 - 27,380 DS (Version 2.1); 4,681 - 18,022 single precision whetstones (for 1 - 4 CPUs)	5 - 19 (for 1 - 4 CPUs)	16M - 256M/64K external, 2K internal	230G/5M	OSI, SNA, TCP/IP, XODIAC	Ethernet, Token Ring	SCSI bus	$120,000+ with 1 CPU, 16M-byte memory, Comprehensive Electronic Office software, operating system
Datapoint Corp. **(512) 593-7900** **(800) 733-1500, Ext. 7884**	7860	Mid- to low-end DEC products	2/33 MHz	Resource Management System; (ARC: Attached Resource Computer)	DOS, OS/2, Unix	Oracle	NP	NP	8M - 128M/ application-dependent	4.74G/ function of disk	TCP/IP, ARC	Ethernet, Token Ring	Open Systems Connection	$21,995+ with 1 CPU, 8M-byte memory, 79M-byte disk
	7960	Mid- to low-end DEC products	6/33 MHz	Resource Management System; (ARC: Attached Resource Computer)	DOS, OS/2, Unix, RMS	Oracle	NP	NP	32M - 256M/ application-dependent	28G/function of disk	TCP/IP, ARC	Ethernet, Token Ring	Open Systems Connection	$100,000 with 2 CPUs, 16M-byte memory, 2 ARC interfaces
Digital Equipment Corp. **(508) 493-3115**	Vaxserver 3100 Models 10e, 20e	IBM AS/400, PS/2, HP 9000, Compaq Deskpro	1/60 nsec.	VMS/Ultrix; (Pathworks)	DOS, OS/2, Unix, Macintosh, VMS, Ultrix	RDB, Oracle, Ingres, Sybase	3.2 Specmarks	3.4 VUPs[3]	4M - 32M/1K on chip	4.8G/1.5M	Decnet, SNA, TPC/IP	Ethernet	OSF/1, Posix	$6,000 - $25,000 with 1 CPU, 4M-byte memory, 121M-byte disk, 4 asynchronous lines, RDB runtime, VMS server license, Pathworks
	Vaxserver 4000 Model 200	IBM AS/400 B45, HP 3000 Model 922, 932, Sun Sparcserver 330	1/35 nsec.	VMS; (Decnet)	DOS, OS/2, Unix, Macintosh, VMS, Ultrix	RDB, Oracle, Ingres, Sybase	13.1 TPC/A trans./sec.; 5 Specmarks	5 VUPs	8M - 64M/6K on chip	21G/4M	Decnet, TPC/IP	Ethernet, Token Ring	OSF/1, Posix	$20,000 - $100,000 witb 1 CPU, 64M-byte memory, 21G-byte disk, RDB runtime, VMS server license, Pathworks
	Vaxserver 4000 Model 300	IBM AS/400 Model 70, HP 3000 Model 932, Sun Sparcserver 390	1/28 nsec.	VMS; (Decnet)	DOS, OS/2, Unix, Macintosh, VMS, Ultrix	RDB	21.6 TPC/A trans./sec.; 8 Specmarks	8 VUPs	32M - 256M/2K on chip, 128K	28G/4M	Decnet, TPC/IP	Ethernet, Token Ring	OSF/1, Posix	$60,000 - $200,000 with 1 CPU, 256M-byte memory, 28G-byte disk, RDB runtime, VMS server license, Pathworks
	VAX 6000 Models 510, 520, 540	IBM AS/400, HP 3000, HP 9000	6/16 nsec.	VMS, Ultrix; (Decnet, Pathworks)	DOS, OS/2, Unix, Macintosh, VMS	ACMS, RDB, Ingres, Oracle, Sybase	33.9 TPC/A trans./sec. local (Model 510 witb VMS, ACMS; 68.5 TPC/A trans./sec. local (Model 510 with VAX DSM)	13 - 49 VUPs	32M - 512M/2K on chip, 512K on board, per CPU	5.9T+/2.8M	Decnet, SNA, TCP/IP, FDDI	Ethernet	Posix, X.400, X Window, DPT, EDI X.12	$127,000, $114,000, $892,000 with 1 CPU, Ethernet, Decnet, RDB database, PC integration services
	VAX 6000 Model 410	IBM AS/400, HP 3000, HP 9000	6/28 nsec.	VMS, Ultrix; (Decnet, Pathworks)	DOS, OS/2, Unix, Macintosh, VMS	ACMS RDB, Ingres, Oracle, Sybase	7.1 Specmarks	7 VUPs	32M - 256M/2K on chip, 128K on board	5.9T+/2.8M	Decnet, SNA, TCP/IP, FDDI	Ethernet	Posix, X.400, X Window, DTP, EDI X.12	$67,000 with 1 CPU, Ethernet, Decnet, RDB database, PC integration services
Encore Computer Corp. **(305) 587-2900**	93 series	Sequent 2000	32/25 MHz	Unix System V; (None)	DOS, Unix, Macintosh	Informix, Ingres, Oracle, Unify	NP	20 per CPU, 80 - 640 for system	64M - 640M/1M - 8M	600M - 126G/4M per device, 49.5 for whole machine	Decnet, OSI, SNA, TCP/IP	Ethernet	Posix	$159,000+ with 4 CPUs, 64M-byte memory, 600M-byte disk
Hewlett-Packard Co. **(800) 752-0900**	HP 3000 Series 922	VAX 3300, IBM AS/400 D35	1/12.5 MHz	MPE/XL; (Portable Netware, LAN Manager XL)	DOS, OS/2, Unix, Macintosh	Allbase SQL, Ingres, Oracle, Sybase	8.9 trans./sec. (estimate)	NP	32M - 128M/32K	12G/11M	IPX/SPX, OSI, SNA, TCP/IP, Named Pipes	Ethernet, Token Ring (via router)	Posix, OSF, DCE, X Window	$46,600 with 1 CPU, 32M-byte memory, 670M-byte disk, terminal emulation software, operating system
	HP 3000 Series 932	VAX 4000 Model 300, IBM AS/400 D45	1/15 MHz	MPE/XL; (Portable Netware, LAN Manager XL)	DOS, OS/2, Unix, Macintosh	Allbase SQL, Ingres, Oracle, Sybase	15.64 trans./sec. (estimate)	NP	32M - 128M/32K	22G/.183M	IPX/SPX, OSI, SNA, TCP/IP, Named Pipes	Ethernet, Token Ring (via router)	Posix, OSF, DCE, X Windows	$51,100 with 1 CPU, 32M-byte memory, 670M-byte disk, terrminal emulation software, operating system
	HP 3000 Series 948	VAX 6510, IBM AS/400 D70	1/28 MHz	MPE/XL; (Portable Netware, LAN Manager XL)	DOS, OS/2, Unix, Macintosh	Allbase SQL, Ingres, Oracle, Sybase	38.4 trans./sec. (estimate)	NP	64M - 256M/512K	34.8G/.183M	IPX/SPX, OSI, SNA, TCP/IP, Named Pipes	Ethernet, Token Ring (via router)	Posix, OSF, DCE, X Windows	$89,300 with 1 CPU, 64M-byte memory, 670M-byte disk, terminal emulation software, operating system
	HP 3000 Series 958	VAX 6520, IBM AS/400 D80	1/50 MHz	MPE/XL; (Portable Netware, LAN Manager XL)	DOS, OS/2, Unix, Macintosh	Allbase SQL, Ingres, Oracle, Sybase	49.5 trans./sec. (estimate)	NP	96M - 256M/512K	34.8G/.183M	IPX/SPX, OSI, SNA, TCP/IP, Named Pipes	Ethernet, Token Ring (via router)	Posix, OSF, DCE, X Windows	$206,800 with 1 CPU, 96M-byte memory, 670M-byte disk, terminal emulation software, operating system
	HP 9000 822S	VAX 3100, IBM 3204, Sun 330	1/25 MHz	HP-UX; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	8 TPC/A	11 x Vax 11/780	8M - 128M/32K	24.1G/.183M	Decnet, OSI, SNA, TCP/IP	Ethernet	OSF/1, Posix, XPG3	$19,950 with 8M-byte memory, 335M-byte disk, 8-user HP-UX user license
	HP 9000 832S	VAX 5000, IBM 520, Sun 470	1/30 MHz	HP-UX; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	13 TPC/A	15	16M - 128M/128K	24.1G/.183M	Decnet, OSI, SNA, TCP/IP	Ethernet	OSF/1, Posix, XPG3	$32,250 with 16M-byte memory, 335M-byte disk, 8-user HP-UX license
	HP 9000 842S	VAX 5000, 5500, IBM 530, 540, Sun 490	1/28 MHz	HP-UX; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	33 TPC/A; 63 TPC/B	29	32M - 256M/512K	24.1G/.183M	Decnet, OSI, SNA, TCP/IP	Ethernet	OSF/1, Posix, XPG3	$85,000 witb 32M-byte memory, 670M-byte disk, 8-user HP-UX license
	HP 9000 852S	DEC 5500, 5800, IBM 850, 950	1/50 MHz	HP-UX; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	43 TPC/A; 88 TPC/B	52	64M - 256M/512K	45.6G/.183M	Decnet, OSI, SNA, TCP/IP	Ethernet	OSF/1, Posix	$143,000 with 64M-byte memory, 670M-byte disk, 8-user HP-UX license
IBM **(800) 426-2468**	AS/400 D series	DEC, HP	2/NP	OS/400; (None)	DOS, OS/2, AIX	SQL/400	6.5 trans./sec. (D10); 10 trans./sec. (D35); 32 trans./sec. (D60); 42.5 (D70)	NP	72 - 384M/NP	27.4-123.4G/NP	OSI, SNA, TCP/IP	Ethernet, Token Ring	SAA	$21,950 (D10) - $730,000 (D80) with 1 - 2 CPUs, 72M- to 384M-byte memory, 27.4G- to 123.4G-byte disk, operating system
MAI Systems Corp. **(714) 730-5100**	GPX Model 5070	AT&T 3B2, IBM RS/6000 Model 530, Prime Series 50	4/20 MHz	Boss/VX dual Universe; (None)	DOS, Unix	None	See footnote[4]	NP	8M - 48M/64K	3.4G/4M	TCP/IP	Ethernet	Unix System V 3.2	$55,000+ with 2 CPUs, 8M-byte memory, 355M-byte disk, 525M-byte tape, 16 ports, 1 modem, diagnostic software

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	COMPARABLE SYSTEMS	MAXIMUM NUMBER OF CPUs/MACHINE CYCLE TIME (MHz)	HOST COMPUTER OPERATING SYSTEM; (NETWORK OPERATING SYSTEM)	CLIENT(S) SUPPORTED	DATABASE(S) SUPPORTED	BENCHMARKS[1]	PERFORMANCE IN MIPS[2]	MEMORY RANGE (BYTES)/CACHE CAPACITY (BYTES)	DISK CAPACITY (BYTES)/DISK TRANSFER RATE (BYTE/SEC)	LAN PROTOCOLS SUPPORTED	SUPPORTS ETHERNET OR TOKEN RING	OPEN SYSTEMS STANDARD SUPPORTED	PRICE RANGE WITH CONFIGURATION
MAI Systems Corp. (cont.)	GPX Model 6070	AT&T 3B2, IBM RS/6000 Model 530, Prime Series 50	10/20 MHz	Boss/VX dual Universe; (None)	DOS, Unix	None	See footnote[4]	NP	16M - 96M/64K	12.5G/4M	TCP/IP	Ethernet	Unix System V Release 3.2	$85,000+ with 2 CPUs, 16M-byte memory, 610M-byte disk, 525M-byte tape, 16 ports, 1 modem, diagnostic software
Mips Computer Systems, Inc. (408) 720-1700	RC3230, RC3330	IBM RS/6000 Model 320, Sun Sparcstation 2	1/25 MHz, 1/33 MHz	RISC/OS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	18.6 Specmarks, 25.1 Specmarks	25, 41	8M - 128M/32K	200M-6.2G/5M	Decnet, OSI, SNA, TCP/IP	Ethernet, optional Token Ring	OSF/1, Posix	$7,000 - $20,000, $11,000-$30,000 (RC 3330) with 1 CPU, 8M- to 128M-byte memory, 200M- to 6.2G-byte disk
	RC 3350	IBM RS/520, Sun Sparcstation 330	1/33.3 MHz	Unix System V Release 3, 4.3BSD; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	26.5 Specmarks	41.5	16M - 128M/64K instruction cache, 64K data cache	12G/5M	Decnet, OSI, SNA, TCP/IP	Same as above	OSF/1, Posix	$36,500 with 1 CPU, 16M-byte memory, 328M-byte disk, 150M-byte tape, unlimited user license
	RC 3360	HP 832 S, IBM 530, Sun Sparcstation 470	1/33 MHz	Unix System V Release 3, 4.3BSD; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	26.5 Specmarks	41.5	32M - 256M/64K	20G/5M	Decnet, OSI, SNA, TCP/IP	Same as above	OSF/1, Posix	$65,500 with 1 CPU, 32M-byte memory, 663M-byte disk, 150M-byte tape, unlimited user license
	RC 6260	IBM 550, Sun Sparcstation 490	1/60 MHz	RISC/OS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	45 Specmarks	68	32M - 384M/64K instruction cache, 512K data cache	160G/NP	Decnet, OSI, SNA, TCP/IP	Same as above	OSF/1, Posix	$139,500 with 1 CPU, 32M-byte memory, 663M-byte disk, 150M-byte tape, Ethernet, unlimited user Unix license
	RC 6280	IBM RS/6000 Model 950, HP 9000/870-100	1/60 MHz	RISC/OS; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle, Sybase	NP	68	32M - 384M/592K	160G/NP	Decnet, OSI, SNA, TCP/IP	Same as above	OSF/1, Posix	$155,500 with 1 CPU, 32M-byte memory, 655M-byte disk, 150M-byte tape, Ethernet, unlimited user Unix license
Modcomp, Inc. (305) 974-1380	Real/Star 1000	Harris Nighthawk, Concurrent	1/25 MHz	Real/IX; (NFS)	DOS, Unix	Informix, Ingres, Oracle, Progress	14.5 Specmarks	28	16M - 256M/128K	Up to 6G/3M	Decnet, TCP/IP	Ethernet	Posix	$33,500 - $110,000 with 1 CPU, 16M- to 256M-byte memory, 300M- to 6G-byte disk, operating system, C compiler, (X Windows, OSF/Motif available separately)
	Real/Star 2000	Harris Nighthawk, Concurrent, Encore 90	4/25 MHz	Real/IX; (NFS)	DOS, Unix	Informix, Ingres, Oracle, Progress	29-58 Specmarks	56-113	16M - 256M/128K	Up to 6G/3M	Decnet, TCP/IP	Ethernet	Posix	$36,700 - $113,600 with 2 - 4 CPUs, 16M- to 256M-byte memory, 300M- to 6G-byte disk, operating system, C compiler (X Window and OSF/Motif available separately)
NCR Corp. (513) 445-5000	NCR Tower 32/300	Altos 600, HP 9000 8085, IBM RS/6000	1/20 MHz	Unix System V Release 3; (Portable Netware)	DOS	Informix, Ingres, Oracle, Unify	10,266 DS (actual)	5.8	4M - 32M/16K	126M-760M/1.25M-1.65M	OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$11,290 - $20,000 with minimum of 4M-byte memory, 126M-byte disk, 3 channels, 150M-byte tape, operating system
	NCR Tower 32/500	Altos 2000, DEC 3100, HP 9000 Model 800, IBM RS/6000	1/20 MHz	Unix System V Release 3; (Portable Netware)	DOS	Informix, Ingres, Oracle, Unify	10,242 DS (actual)	5.8	16M - 64M/16K	126M-2.3G/1.25M - 1.65M	OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$14,300 - $63,900 with 1 CPU, minimum of 4M-byte memory, minimum of 170M-byte drive, 7 channels. 150M-byte tape, operating system
	NCR Tower 32/750	Compaq Systempro, DEC 486/33, HP 9000 832 series, IBM RS/6000 Model 520	1/25 MHz	Unix System V Release 3; (Portable Netware)	DOS	Informix, Ingres, Oracle, Unify	33,296 DS (actual)	19	16M - 64M/8K	126M-2.3G/1.6M-2.5M	OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$23,500-$76,000 with 1 CPU, minimum of 8M-byte memory, minimum of 126M-byte disk, 7 channels, 433M-1.3G-byte DAT, operating system
	NCR Tower 32/850	HP 9000 Models 850, 855, IBM RS/6000, Sequent Symmetry S/27, Pyramid Miservers	6/30 MHz	Unix System V Release 3; (Portable Netware)	DOS	Informix, Ingres, Oracle, Unify	11,655 DS (actual)	6.6	8M - 384M/240K	170M - 6G/2M - 4M	OSI, SNA, TCP/IP	Ethernet	Posix	$81,300+ with 1 - 6 CPUs, minimum of 8M-byte memory per CPU, minimum of 760M-byte disk, 20 channels, 433M- to 1.3G-byte DAT, operating system
Prime Computer, Inc. (508) 620-2800	50 Series, Models 5310, 5320, 5330, 5340, 5370, 6450, 6650	DEC VAX 4000, HP 3000, IBM AS/400	1 - 2/36.6 - 120 nsec.	Primos; (NP)	Token Ring	Prime Information, Informix, Ingres, Oracle	2,488 - 60,526 DS; 0.2 - 4.7 LP (200 x 200), BLAS (actual)	5.6 - 34.4	8M - 128M/128K	Up to 26.1G/2.5M	SNA	Ethernet, Token Ring	NP	Up to $1 million with 1 - 2 CPUs with minimum of 8M-byte memory, 32 channels, terminal, tape drive, power supply, 328M-byte disk
Pyramid Technology Corp. (415) 965-7200	Miserver S Series	DEC VAX 9000, HP 9000, Sequent 2000	12/33 MHz	Unix System V Release 4; (Portable Netware)	DOS, OS/2, Unix, Macintosh	Over 20, including Informix, Ingres, Sybase, Unify	NP	10-300	16M - 512M/4M	113G/NP	Decnet, OSI, SNA, TCP/IP	Ethernet	Posix, XPG3	$55,000 - $1.5M with 1 - 12 CPUs, 16M- to 512M-byte memory, 332M- to 113G-byte disk
Sequent Computer Systems, Inc. (503) 626-5700, (800) 854-0428	Symmetry 2000/40, 2000/200, 2000/400, 2000/700	VAX 6000, 9000, HP 9000, IBM RS/6000, Pyramid S series	30/33 MHz (Model 40), 25 MHz (rest of models)	Dynix/PTX; (LAN Manager for Unix, PC-NFS)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Focus, Cincom's Supra, Sybase, Pick	129 TPC/A; 319 TPC/B	14 - 420	80M - 816M/512K	86.8G/3M	Decnet, OSI, SNA, TCP/IP	Ethernet	Posix, XPG3, FIPS, SVID	$16,450 - $2.5 million with 1 - 30 CPUs, 8M- to 816M-byte memory, 316M- to 86.8G-byte disk, operating system, C compiler, parallel programming library
Sequoia Systems, Inc. (508) 480-0800	Series 300	Stratus XA2000, Tandem Cyclone	32/25 MHz per CPU	Unix System V Release 3; (NFS)	DOS, OS/2, Unix, Macintosh, HP/Apollo, Sun	Informix, Ingres, Oracle, Pick, Unify	251 DC	20 - 640	32M - 4G/2M - 64M	760M - 2T/2M per disk	OSI, SNA, TCP/IP	Ethernet	Posix	$300,000 with 2 CPUs, 128M-byte memory, 1.8G-byte disk, tape drive, 100 I/O ports, Uniplex E-mail software
Siemens Nixdorf Information Systems, Inc. (617) 273-0480	Targon 35/70	NCR 32/700, 32/825, Pyramid, Unisys 5000/95, 70005X	1-4/10 MHz	Targon Operating System; (Standard network operating system)	Unix	Informix, Oracle	NP	48	16M - 128M/128M	17.6G/2.46M	Decnet, OSI, SNA, TCP/IP	Ethernet, Token Ring	OSF/1, Posix, X Open, XPG3	$153,455 with 1 CPU, 32M-byte memory, 1G-byte disk, tape, printer, Ethernet, disk interfaces, system console
Stratus Computer, Inc. (508) 460-2000	XA2000 Continuous Processing Systems Models 30, 75, 80, 200 - 280	DEC Vaxcluster, FT, Tandem VLX and CLX	8 duplexed (Model 280)/ 24 MHz	VOS, FTX; (None)	DOS, OS/2, Unix	Oracle, Sybase, Informix (under the FTX operating system)	132,130 trans./hour, moderate mix; 99,470 trans./hour, heavy mix (actual)	NP	8M - 32M (Model 30), 64M (Models 270, 280) - 32M (Model 30) 128M (200 series Models)/128K per CPU	1.3G (Model 30) - 31.2G (200 Series Models)/2.5M - 25M	Decnet, OSI, SNA, TCP/IP, NFS, Netbios	Ethernet, Token Ring	Posix, SVID Issue 2	$49,800 (Model 30) - $1.4 million (Model 280) with 1 - 8 duplexed CPUs, 8M-byte to 64M-bye memory, 152M-byte disk, VOS or FTX operating system, duplexed power supplies, battery backup
	XA/R Model 20 Continuous Processing System	Tandem Integrity S2	1 duplexed CPU/ 32 MHz	VOS, FTX, Pick; (None)	DOS, OS/2, Unix	Oracle, Sybase, Informix (under the FTX operating system)	NP	NP	32M - 96M (duplexed) /4K instruction cache, 8K data cache, 512K on-board cache	7G/4M-12M	Decnet, OSI, SNA, TCP/IP, Netbios, NFS	Ethernet, Token Ring	Posix, XPC/3, SVID Issue 3, FIPS 151 - 1	$275,000 with VOS; $247,000 with FTX with 1 duplexed CPU, 32M-byte duplexed memory, 1 duplexed input/output system, duplexed power supply, battery backup

VENDOR	PRODUCT	COMPARABLE SYSTEMS	MAXIMUM NUMBER OF CPUs/MACHINE CYCLE TIME (MHz)	HOST COMPUTER OPERATING SYSTEM; (NETWORK OPERATING SYSTEM)	CLIENT(S) SUPPORTED	DATABASE(S) SUPPORTED	BENCHMARKS[1]	PERFORMANCE IN MIPS[2]	MEMORY RANGE (BYTES)/CACHE CAPACITY (BYTES)	DISK CAPACITY (BYTES)/DISK TRANSFER RATE (BYTE/SEC)	LAN PROTOCOLS SUPPORTED	SUPPORTS ETHERNET OR TOKEN RING	OPEN SYSTEMS STANDARD SUPPORTED	PRICE RANGE WITH CONFIGURATION
Tandem Computers, Inc. (408) 285-6000	Nonstop CLX 800	VAX 6000, IBM AS/400, ES/9000 (air-cooled)	16/60.6 MHz	Guardian 90; (Expand, Multilan)	DOS, OS/2, Unix, Macintosh	Nonstop SQL	13.2 TPC/A (CLX 820); 25.9 TPC/A (CLX 840); 103.6 (CLX 888)	NP	256M - 512M/3.1G	405.9G/ 1.88M	OSI, TCP/IP, Tandem Expand	Ethernet	XAPIA, X.400, FTAM	$125,000 (CLX 820) - $965,000 (CLX 888) with 2 - 16 CPUs, 32M- to 512M-byte memory, 1.2G- to 10.3G-byte disk, operating system, DBMS
Unisys Corp. (215) 986-4011	U6000/51, U6000/55	IBM RS/6000, NCR 3000, Tower series	1/25 MHz, 1/33 MHz	Unix System V Release 3.2; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle	10 TPC/A trans./sec. (U6000/55)	8, 10	4M - 80M/64K	168M - 3.96G/2.5M	IPX/SPX, OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$15,000 - $55,000, $21,000 - $75,000 (U6000/55)
	U6000/60	IBM RS/6000, NCR 3000, Tower series	1/25 MHz	Unix System V Release 3.2; (Portable Netware, LAN Manager for Unix)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle	NP	15	4M - 80M/64K external, 16K internal	168M - 3.96G/2.5M	IPX/SPX, OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$24,500 - $92,000
	U6000/65	AT& T Starserver, IBM RS/6000, NCR 3000 series	5/33 MHz	Unix System V Release 4; (Portable Netware, LAN Manager for Unix, PC Interface)	DOS, OS/2, Unix, Macintosh	Informix, Ingres, Oracle	NP	27 - 118	16M - 256M/256K	168M - 40G+/5M	IPX/SPX, OSI, SNA, TCP/IP	Ethernet, Token Ring	Posix	$36,000 - $350,000
	U6000/75, U6000/85	Decsystem, HP 9000, Pyramid Miserver	30/25 MHz	Unix System V Release 3, (Portable Netware, PC Interface)	DOS, OS/2, Macintosh	Informix, Oracle	129 TPC/A	28 - 420	40M - 384M/512K per CPU	330M - 90G/3M	IPX/SPX, OSI, SNA, TCP/IP, X.25	Ethernet	Posix, Xopen, XPG3	$145,000 - $1 million or more with 2 CPUs, 8M-byte memory, 330M-byte disk, 16 asynchronous ports, 150M-byte QIC tape drive
Wang Laboratories, Inc. (508) 459-5000	VS5000	IBM AS/400	1/25 MHz, 33MHz	VS/OS; (Banyan Vines)	DOS, DOS Windows	Oracle, Pace, Focus, Natural Adabas	NP	NP	4M - 32M/NP	40G/3.3M/NP	SNA, TCP/IP, XNS	Ethernet, Token Ring	NP	$12,000 - $125,000 with 1 CPU, 4M - 32M-byte memory, 326M - 40 G-byte disk
	VS8000	IBM AS/400 B60, VAX 6000	1/60 - 120 nsec	VS/OS; (Banyan Vines)	DOS, DOS Windows	Oracle, Pace, Focus, Natural Adabas	NP	NP	8M - 128M/128K	100G/5M	SNA, TCP/IP, XNS	Ethernet, Token Ring	NP	$126,000 with 1 CPU, 8M-byte memory, over 326M-byte disk per CPU
	VS10000	IBM 4381, DEC VAX	1/44 - 110 nsec	VS/OS; (Banyan Vines)	DOS, DOS Windows	Oracle, Pace, Focus, Natural Adabas	NP	NP	16M - 128M/32K - 128K	100G/3M	SNA, TCP/IP, XNS	Ethernet, Token Ring	NP	$525,000 - $750,000 with 1 CPU, 32M- to 128M-byte disk, 324M- to 100G-byte disk

Strategy

CONTINUED FROM PAGE 65

developers for its platforms.

Where HP's problem lies, according to Cambridge, Mass.-based Forrester Research, Inc., is in its user ratings and market presence in Fortune 1,000 accounts.

Data General

Data General Corp. has shifted its focus from the MV/Eclipse, its proprietary minicomputer, to the more open world of the Aviion workstation.

DG is aggressively promoting its Aviion as a standards-based system, with support for Netware and planned support for LAN Manager. The company's host communications are relatively robust, but the ability of its systems to integrate with other servers remains a question.

DG also has a strong client/server software offering — CEO Object Office — that runs on the Eclipse and is compatible with HP's New Wave environment. DG is recruiting third-party vendors for further database and applications support.

Wang

The plan at Wang Laboratories, Inc. is to transfer its experience in imaging and office applications to the open systems and networking markets.

These Open Image products run not only on Wang's own minicomputer servers but also on native Netware servers for non-Wang local-area networks.

Wang supports Portable Netware on its VS systems and provides one of the most robust implementations of Banyan Systems, Inc.'s Virtual Networking Software (Vines) on the VS. It does not support LAN Manager, however. Wang also provides a SQL-based database for Vines and Oracle Corp.'s database.

Stratus

Stratus Computer, Inc. has upped its server participation, supporting standards bodies and lending its support — along with IBM and HP — to companies such as Transarc Corp., which offers distributed transaction processing protocols. Stratus supports Netware, and it offers excellent connectivity with IBM hosts. Its products also integrate well with other systems.

Stratus is positioning its machines as high-availability processors for critical on-line applications in a client/server mode — a narrow but increasingly popular niche.

Unisys

The U6000 line is where Unisys Corp. is focusing its server efforts. These systems support Portable Netware and offer a high level of integration between Unix applications and the network environment. Unisys has also stated that it will support PCs in a peer-to-peer mode on its larger networks. However, its support of other protocols such as TCP/IP is lacking.

Prime

Prime Computer, Inc. has made a headlong rush into the client/server environment, establishing an alliance with Novell and rapidly announcing server products. Its primary focus seems to be in technical areas such as computer-aided design and manufacturing. However, Prime is still not seen as a company whose products integrate well with other systems. It has made some efforts recently, however, to gain third-party software support. •

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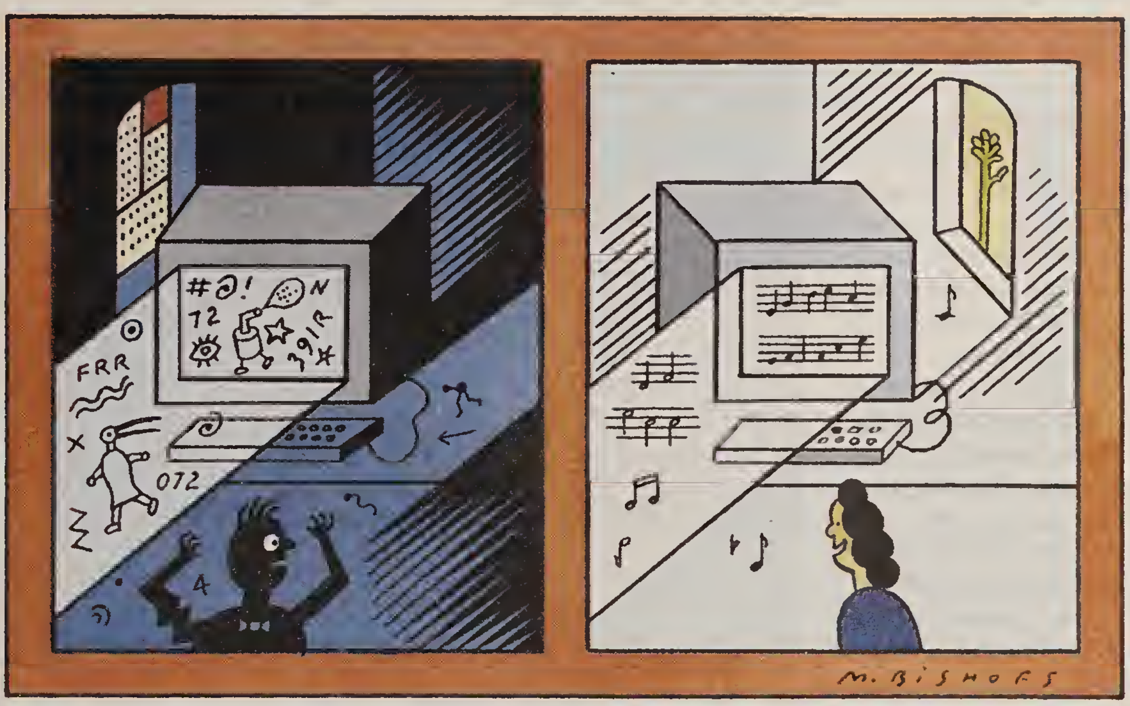
Getting the process right

Before moving automated software development from pilot to production mode, make sure your development process is stable and manageable

BY GREG BOONE
AND VAUGHAN MERLYN



Maris Bishofs

While most companies are managing pilot CASE programs effectively, it's during full-scale implementation that the real problems become apparent.

In a pilot, the project team is handpicked, the application is carefully selected, and the team is coddled with extra support and resources. With this special attention, the implementation can go very smoothly. Generally, this situation makes a good showing for computer-aided software engineering (CASE).

It is when you move CASE beyond pilot programs into widespread use that problems crop up. Resistance, skepticism and disasters are not uncommon. These problems are the result of the failure of many software development organizations to recognize that CASE does not just speed up existing software development activities. Rather, it transforms the software development process.

Companies that understand this difference are paying attention to how software is developed, not just looking to buy new development technologies. They realize that hundreds of small improvements to the software development process add up to huge savings in development time.

Firms that don't understand this difference are dealing with an invisible, unmanageable process subject to change with every new technology. The challenge for information systems is to concentrate on the software development process, not just the technology, managing the quality improvements and organizational changes that are likely to occur.

Housecleaning

Organizations with ill-defined processes and poor methods shouldn't try to justify CASE until they get their houses in order. It's embarrassing to realize how many organizations buying CASE don't know that structured methods, data modeling methods, project management techniques and more disciplined practices are what CASE is really about.

Instead, they think they are buying only an "automated" solution. Without a change to the existing software development processes, however, the technology is worse than worthless. It can actually get in the way.

What is a process? It is a set of activities that transforms inputs into a useful output. Processes are generally repetitious, as with an accounting process such as payroll. What is a software development process? It is the transformation of customer needs into a useful software output.

It is difficult, however, to describe the software development process explicitly. The world of information management, real-time systems and embedded software is already highly abstract and invisible.

What takes place is a highly complicated series of activities undertaken in a highly individualized crafting manner. One of the characteristics of the craft style of building software is that its attempts to improve quality and productivity are only as good as the skill level of the specific individual producing the product. And because the "project" is the vehicle for organizing work, it becomes difficult to see software development as a continuous process instead of a unique, discrete effort.

As long as the software development process exists only in the heads of individual developers, it will remain unmanageable, difficult to improve and subject to the changing technology. The process can only be managed to the extent it is clearly known.

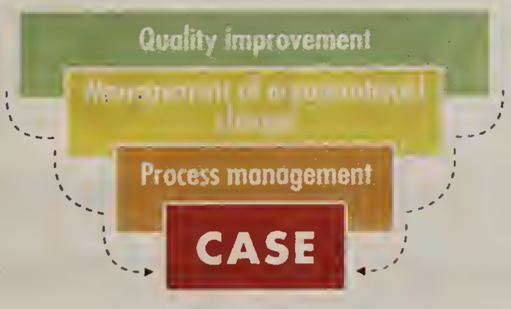
For example, what is the process of moving from the analysis phase of development to design? How do designers do their jobs? What sequence of activities do they pursue? Is it always the same, or is it different? When is it different, and why? Do they know why? What considerations do they take into account? What methods do they use?

When software development is low in process and high in dependence on technology-

Continued on page 76

Boone is president of Systems Research, Inc., an Issaquah, Wash.-based consulting company specializing in total quality improvement. Merlyn is a partner at Ernst & Young's Center for Information Strategy and Technology in Boston.

The new context for CASE
Companies should approach CASE implementation from a holistic viewpoint



- **Continuous process improvement is the goal**
- **Motorola, HP have spruced up their processes**
- **Don't overlook the human impact of change**

Continued from page 75

specific individual expertise, then changes in technology have an enormous impact on the productivity and capability of software developers. By contrast, traditional engineers may use new materials with radically different properties, but because they have a better defined, proven process, there is less impact.

Therefore, there are very good reasons for attacking processes first. Once you understand the process, changes to it are more meaningful and manageable.

Process improvements, which can lay the groundwork for CASE, can be arrived at quite simply or more rigorously.

One IS shop with an unusually high number of maintenance requests had a practice of extensive financial analysis for each one before proceeding. This analysis also examined the extent of the change and was used for making decisions about request priority.

One day, a programmer discovered extensive analysis was extraneous. Maintenance requests could be divided into categories of large, medium and small, with small ones taking less than one day, medium ones up to four days and large ones longer. Furthermore, it didn't take much effort to make that determination.

Now, the company does a first cut on the requests by size and has significantly reduced labor from unnecessary analysis of maintenance requests. It has also speeded up the response to requests.

Motorola, Inc. has also recently demonstrated the value of having a defined process. The company was faced with an older methodology that forced an overly elaborate software development process. It also handled certain types of development problems inadequately, specifically those related to distributed systems.

First, IS streamlined the methodology by producing what it calls a "project administration manual." This outline delineates the overall software development process with references to other manuals and documents, depending on the requirements of the specific applications development effort. In this way, developers don't have to wade through 13 three-ring notebooks to find what they need.

Second, it developed a new adaptation of the distributed systems methodology. Because Motorola has developers dispersed throughout the world supporting these systems, it has been an enormous benefit for everyone to be able to use a common frame of reference for software development.

While both firms use CASE, what is important is their process improvement initiatives. The improvements made by the companies above weren't responses to special circumstances; they were responses to repeatedly encountered circumstances.

Rather than work around or ignore the problem altogether, these companies sought the cause and implemented a remedy that eliminated the source of the chronic problems. This preventative approach is key to making sustainable progress. Such remedies free up valuable resources to take on new classes of problems rather than waste time solving the same problem over and over again.

Derived from Japanese thought

A more advanced improvement approach is called continuous process improvement. It is based on the Japanese philosophy known as kaizen, the ethic of constantly seeking incremental improvement and perfecting existing processes. Kaizen, process engineering, continuous process improvement, employee involvement, feedback loops and measurement are some of the key features of the new quality movement known as total quality management.

Continuous process improvement differs from process improvement in that it relies on a stable process, a process that is consistently followed and repeatable, one that gives reasonably consistent results.

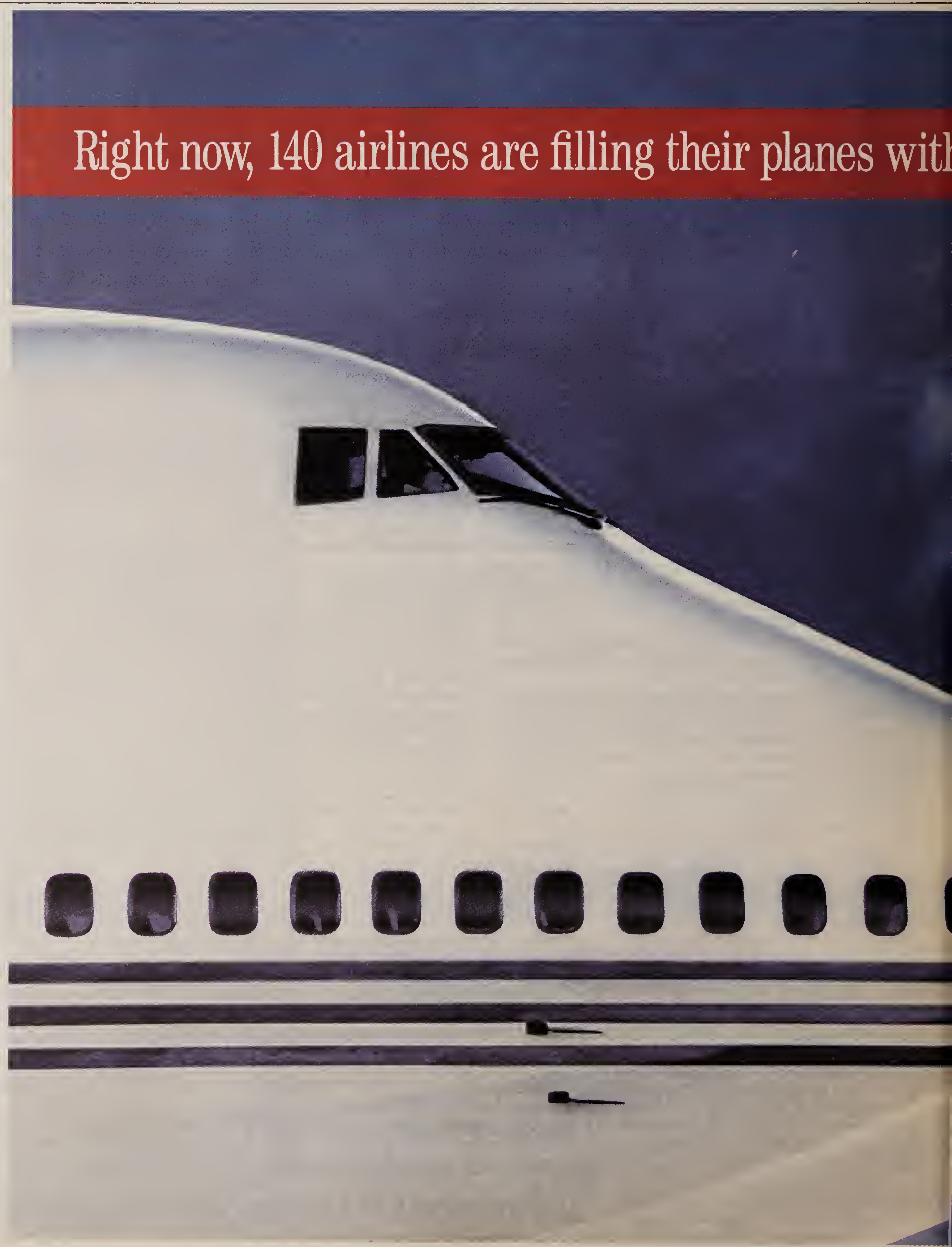
A simple indication of a stable, consistent process is project cost and schedule estimation. If actual software development results are within 5% to 10% of the estimates more than 95% of the time, you have a good chance of having a relatively

Mark of distinction

What is the distinction between process management and process engineering? **Process management** describes management commitment and actions to transform the work environment so that everyone in the organization can cooperatively work on the continuous improvement of processes.

Process management contrasts with project managment in that project management refers to the techniques used to create a specific product or service successfully within the process framework. Process management establishes the framework and improves it.

Processes are improved by **process engineering**, which involves systematic measurement, evaluation of measurement, team problem identification and team problem-solving, as well as the implementation of changes to the work production system.



stable process. If not, the process is probably ad hoc, improvised and variable.

One of the hallmarks of continuous process improvement is decision-making based on facts, not intuition. This means continually monitoring the process and providing feedback.

Hewlett-Packard Co. is an example of a firm that applies the principle of continuous process improvement and feedback loops in its software development process. HP has a team of developers responsible for porting software to all HP hardware platforms. Through the collection of errors and defect data, the firm determined that a chief cause of problems had to do with register utilization. It found that the team had inadequate training in register use and applied a remedy: training. A class of errors was eliminated.

Only by taking a process improvement view can the real breakthroughs in productivity be obtained. The technology solution alone has proven insufficient.

Implementing such process improvement initiatives is not without cost, although few of the actual improvements involve significant cash expenditures. The real cost is the agony of change. Organizations and individuals can have a very difficult time coming to grips with the nature of change and the implications of change — how responsibilities are altered, how a person's role changes in the eyes of his peers, how power bases are affected and so forth (see story below).

These factors are very real and crucial to manage if a process change is to be successful. Change must be accomplished within the expected time frame and at the expected cost. Too often, the change takes significantly longer, and the cost is far more than expected. Many CASE implementations are abandoned midstream for these very reasons.

Instead, if firms are sensitive to the reaction to change and the change process, resistance could be anticipated and handled constructively. The stresses involved in moving from uninformed optimism to informed pessimism during CASE implementations are predictable.

Various forms of what organization development specialists call "interventions" can be used to facilitate change. For example, an assessment is a form of intervention that finds out the current state of an organization, including its strengths and weaknesses. Gauging the magnitude of the weaknesses is imperative because unless an organization acknowledges the status quo and is dissatisfied with it, there is little motivation for change.

Employee involvement in the design and implementation of the change is crucial. Furthermore, recognizing that "informed pessimism" is a normal stage in the change process can be sufficiently reassuring in itself.

New context for CASE

Companies should approach CASE implementation challenges from a holistic viewpoint. CASE shows up the deficiencies in software development practices. The new battleground is no longer CASE but continuous process improvement. Basically, companies know a lot about technology but have missed an obvious and essential element: the context for the technology (see chart page 75). Those companies that have paid attention to this context have been more successful. Without a context, the technology lacks purpose, direction and integration into the existing environment.

The context for CASE includes an appreciation for explicitly managing and continually improving the software development process. In turn, the software development process cannot undergo significant transformation without paying attention to the human response and managing organizational change.

The context of process engineering and managing change explain the new emphasis on quality rather than productivity. That's when CASE will be a success. •

Stressed for success

The change wrought by revamping the development process and zeroing in on quality can be stressful for IS workers. Here are some questions firms implementing CASE may need to deal with:

- **IS skills portfolio:** What skills exist now, and how will they change? Should developers forego their technical skills for the softer analysis, design and communications skills? Why should developers give up their successful "artisan" approaches for engineering disciplines?
- **Resistance:** How can resistance be managed?
- **Motivation:** How will developers be motivated to adopt CASE? How do you convince developers to share their work with others in a high-reuse environment rather than creating original work?
- **Participation:** Will everyone have to adopt CASE or just those who are willing and able?
- **Career paths:** How will career paths change? Will valuable developers leave?

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COMPUTER INDUSTRY

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Whodunit?

▶ **Digital Equipment Corp.** did it; so did **AT&T**, **Sun Microsystems, Inc.**, **Hewlett-Packard Co.**, **Microsoft Corp.** — and now, **IBM** has done it, too. Last week, IBM became the latest of approximately 130 computer industry vendors and users to join The Object Management Group, a Framingham, Mass.-based association dedicated to the development of guidelines and standards for the creation and implementation of object-oriented systems.

Buy and cell agreement

▶ **Ameritech** continued down its avowed expansion path last month with the purchase of cellular communications service providers **Cybertel Financial Corp.** and **Cybertel RSA Cellular L.P.** The Chicago-based telecommunications player will pay an approximate $512 million in cash for the Cybertel firms, which serve the St. Louis metropolitan area.

State of the Art offering

▶ As of May 23, **State of the Art, Inc.** is a public company. The Irvine, Calif.-based high-end microcomputer accounting software firm completed an initial public offering of 3.45 million shares at $9 per share, raising some $12 million. The funds will be used to provide liquidity to State of the Art's early-stage investors as well as to position the company for future growth, according to a spokesman.

Jolly good fellows

▶ Five employees have been named **IBM** fellows, winning their firm's premier technical honor and the chance to pursue their choice of projects for the next five years. Singled out for their contributions to technology were: programming languages and systems design specialist **Marc Auslander**, a reduced instruction set computing pioneer; **Paul Bardell**, whose achievements in built-in testing of digital circuits helped speed the Enterprise System/9000 to market; **Richard Baum**, also noted within the company for his contributions as a large-systems architect; **Tak H. Ning**, noted for his work in semiconductor technology; and **Bernhard Pogge**, an innovator in the semiconductor fabrication process arena.

It's got the whole world in its plans

BY CAROL HILDEBRAND
CW STAFF

WILMINGTON, Mass. — Ian Davison is a man who likes to think in terms of the big picture, which perhaps explains his company. While many other firms are scrambling to position for global commerce, Octocom Systems, Inc. is not: It was founded specifically as a global enterprise.

"Our first customers were on the West Coast [of the U.S.], London and Sydney [Australia]," said Davison, president and founder of the 6-year-old firm.

Octocom, which manufactures and supports network access and management systems, has parlayed its global outlook into a financial success. Its 14,886% growth over the past five years landed it the ninth spot on *Inc.* magazine's 1990 listing of America's 500 fastest-growing privately held companies.

Up and Coming:
Octocom Systems, Inc.

- **Location:** Wilmington, Mass.
- **Incorporated:** 1984
- **President:** Ian Davison
- **Employees:** approx. 180
- **Product line:** modems, network management systems, security devices

Its figure of 80% of revenue derived from exports has garnered national attention. Recently addressing a group of some 350 New England-area business and government representatives on the urgency of developing export expertise, President Bush made references to Octocom as exemplary.

The company has also received the president's "E" award, given to companies showing excellence in exporting.

Balance the key

Davison based his firm on what he calls the "founding balance." He noted, "What we did was create a corporation that fundamentally melted together the basic attributes of European innovation, American technology and the vital commodity from the Far East that is generally referred to as quality and support.

"If you get the founding balance right, everything in the business will automatically create itself," Davison said.

This means that while having good technology remains important, it should not be the overriding factor, he added. Finding innovative uses and marketing strategies for a business' technology as well as total concentration on service and support are vital to commanding a place in the global business sphere, he said.

Octocom's Davison *credits his firm's growth to a 'founding balance'*

Octocom claimed its place in the sun by designing products that satisfy the myriad regulatory environments, telecommunications bodies and applications requirements found in various countries. For example, one of the firm's early products was a modem that put four communications standards in one box, Davison said.

The Quattro modem, as it was called, married Europe's prevailing standard with several others used in different parts of the world, obviating the need for multinational users to buy two or three different products.

"Octocom made a very conscious decision from the beginning that in almost everything they did they were going to look at international opportunities," said Abbie Goodman, executive director of the Massachusetts Office of International Trade.

"There are a lot of market opportunities out there, but the only way companies will benefit is if they go into them and do something about it," Goodman explained.

Recession clouds are also not as threatening to Octocom's financial picture as they have been to the bottom lines of many other firms. Recession in one part of the market is often offset by increased activity in another sector, Davison said. "U.S. business could halve, and it would have no effect [on us]," he said. "We'd just pick it up from somewhere like Indochina."

Being able to ride out regional downturns is a key Octocom strength, agreed Andrew Bendheim, director of the Massachusetts Port Authority's trade development unit.

"They'll be able to take advantage of different economic

Continued on page 80

New face, new focus at head of MDSI

Move to open systems closes profit gap at systems integration firm

BY NELL MARGOLIS
CW STAFF

ST. LOUIS — What do you get when you divide 31 into 3? At McDonnell Douglas Systems Integration Co. (MDSI), the answer is $398 million.

In the past two years, the computer arm of aerospace player McDonnell Douglas Corp. has undergone a quiet revolution. Under the stewardship of Mark Kuhlmann, then president and now the firm's general counsel, the 30-year-old company switched its product emphasis from turnkey hardware systems to manufacturing and geographical information systems (GIS) software. It also sold off noncore businesses and whipped what remained of its 31 autonomous business units into a tightly focused triad: Manufacturing & Engineering (M&E), including computer-aided design and manufacturing (CAD/CAM); Infrastructure Solutions, or GIS; and Information Systems, which includes outsourcing and systems integration consulting.

Emphasis on standards

Additionally — and critically — MDSI "embraced standards wholesale," said former M&E head John Mazzola, who succeeded Kuhlmann as MDSI president in April. The move to open systems, he said, makes the firm "possibly the only CAD/CAM vendor that isn't hardware-aligned."

As a result, in 1990, the firm that for years had been awash in red ink posted its second consecutive year of solid profit, tripling pretax earnings to $11 million on worldwide revenue of $398 million, some 90% of which came from external sales. It also logged a cash flow increase that exceeded its plan by $40 million, saw its backlog swell 57% over that of 1989, completed the streamlining of its businesses from eight at the year's start to the targeted three and recorded a 57% increase in government systems integration sales and a 21% worldwide revenue growth in its manufacturing software.

MDSI's Mazzola *says MDSI has 'embraced standards wholesale'*

In the consulting industry, where "You've got to walk the talk" is an oft-mouthed maxim, MDSI's dramatic turnaround gives the firm not only the ability to blast further ahead into its target markets but also credibility with which to offer its services. Indeed, in its systems integrator role, the company plans to preach what it has painstakingly learned to practice, Mazzola said.

"The sobering reality is, you can spend huge amounts of R&D time and money, and there's always going to be someone out there with a product that's better than yours in some way, for some customer," he said.

Whole world

FROM PAGE 79

cycles," Bendheim said. "Not everybody goes into recession at the same time as Boston or New England." Working in a global marketplace also allows the firm to compete in arenas that are far less competitive than the crowded domestic scene, he added.

So far, the formula certainly seems to be working for Octocom. Last year, as the U.S. recession battered the bottom lines of many firms, Octocom logged a 40% growth in revenue.

Global foresight

In addition to seeing the international advantage before "global" became an industry buzzword, Octocom has also benefited from an early and consistent focus on service and support. Its two support centers in the UK and the U.S. operate 24-hour call-in centers. Jeff Shaw, vice president of global support operations, said he takes to heart the Avis, Inc. principle of "We try harder."

"Sometimes we do things that aren't always cost-effective for us," he said. For example, "We send a guy to Japan, and he doesn't leave until the problem is fixed. But that's the attitude," he explained.

Shaw noted that the international aspect can make for some unusual hours, citing a 2 a.m. walk-through with a client to try to isolate a problem.

"That's just the kind of stuff you have to do," he said. "Working internationally, you just understand time zones and just think differently."

Octocom moves its products through a series of local distributors, except in the UK, where it operates a wholly owned subsidiary. According to Sales Vice President Rob Scott, this distribution network serves a number of purposes. It establishes a company presence quickly and inexpensively by sidestepping issues such as language barriers, company registration, mandatory hiring of local employees and the lengthy process of getting import approval from the local post office, he said.

The distributor base currently represents about 80% of the firm's business, although there are plans to add more subsidiaries, Scott said. "We'll pick off the individual countries where we feel we'll make the best impact with direct sales," he said, referring to nations with a current high rate of sales or areas in which a distributor is not doing well.

Davison, who said he would like to see sales increase by as much as 60% next year, also expects regional markets to slowly adapt to a more global perspective. "By the time we get to the millenium, most people — bankers, lawyers, whatever — will have the same concepts of expectation with equal amounts of innovation, fundamentally applied technology and service and support."

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INTERNATIONAL

BRIEFS

Sharp thinking

▶ Japan's **Sharp Corp.** and **Samas-Groep NV**, the Utrecht, Netherlands-based parent of Sharp's Dutch distributor, **Ormas BV**, have teamed up to establish a Sharp sales subsidiary in Houten, The Netherlands. Opened last week, the new concern is aimed at reinforcing Sharp's distribution channels in The Netherlands in time for the scheduled 1992 unification of the European Community market. Sharp and Samas said they are targeting the $33 million mark for their venture's first-year revenue; second-year sales are projected at $48 million.

What's up down under

▶ Despite structural casualties, the **Australian** information technology industry will continue to outperform the nation's economy, according to market research firm International Data Corp. Australia. Hardware sales will slow considerably, gaining by only 5% between now and 1995; software and services, which are projected at 16.3% growth by 1995, will help fuel industry growth, the firm said.

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   - 80. Government - State/Federal/Local
   - 85. Communications Systems/Public Utilities/Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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The Newsweekly of Information Systems Management

NEC to plow profits into microchips

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Although microchip sales, notably in memory chips, dragged its bottom line down last fiscal year, NEC Corp. plans to pump up semiconductor production this year.

NEC recently announced that declining memory prices drove down 1990 net profits 36.2% to $386 million. According to industry projections, investment by Japan's semiconductor companies will be off this year from the double-digit growth logged in recent years to only 5% of sales, the result of soft personal computer sales and trade pressure from the U.S.

Nonetheless, analysts here said they expect chip makers to put their money behind next-generation 16M-bit dynamic random-access memory chips starting this year and continuing into 1992.

NEC, which produced $5.58 billion worth of semiconductors in its most recent fiscal year ended March 31 — a 6.6% year-to-year increase — plans to produce 10.3% more microchips of all types this year for a total valued at $6.15 billion, the company said. The figures include both captive consumption and overseas sales of microchips.

- Last year, NEC consumed 27% of its overall production. This fiscal year, which began April 1, it said it plans to use 25% of its production in its own products.
- Last year, the firm exported $819.23 million worth of microchips, not counting parts made overseas and exported to other countries — a 5.8% decrease from the previous year. This year, it expects to export $892.31 million, an 8.9% increase.
- Last year, NEC invested $807.69 million worldwide; this year, it plans to invest $923.08 million.

The firm is currently plowing $384.62 million into a new plant in Japan to be called NEC Yamagata Ltd. It is scheduled to be completed in the third quarter of 1992 and begin trial production of custom, large-scale integrations in the fourth quarter of fiscal 1992. Mass production is scheduled for the first half of fiscal 1993.

RISC chips from Mips

NEC is already producing reduced instruction set computing (RISC) chips under license from Mips Computer Systems, Inc. in the U.S. It is now shipping and producing the 40-MHz VR3000 chip, which it claims is the fastest in the world, and is gearing up to produce the VR4000, which will likely be produced in Japan.

NEC said the VR4000 is its opportunity to become a big player in the microprocessor market. Although it produces complex instruction set computing (CISC) chips, its proprietary V series, it admits to being behind in the CISC area.

"NEC doesn't have the CISC products to be a majority producer, but we do have a chance in RISC," said Hajime Sasaki, vice president and director at NEC, in a recent press briefing. Along with Kubota Corp. and Sony Corp., NEC has joined the Advanced Computing Environment initiative, a U.S. effort to promote the Mips RISC chip as a standard.

Although strong in semiconductor memory technology and products, Japanese companies have lagged behind U.S. firms in microprocessor development.

Industry observers here said they see the VR4000 as a product that could transform NEC into a major microprocessor producer, as it plans to make the VR4000 in Japan. "We have the production capacity to produce whatever amount is needed," Sasaki claimed.

NEC said it plans to make a total of 100,000 VR3000 and VR4000 Mips RISC chips per month in 1992.

In addition, the firm said it is planning to develop its CISC architecture further to use the V60, 70 and 80 microprocessors in applications, including embedded controllers, customized processors for factory automation and telephone switches. It is now making 1.5 million processors per month in the 16- to 32-bit V series and about 30,000 monthly of the V60, 70 and 80 CISC products. The firm is covering both bases, as Sasaki said RISC CPUs could be used instead of CISC chips in low-end products.

NEC sent a sample of the 50-MHz VR4000 to Mips in April for testing, which is expected to be completed this month, Sasaki said.

In addition to focusing on memory and RISC chips, the firm is pushing into Application Specific Integrated Circuits (ASIC). NEC now has 18 ASIC design centers overseas and plans to add new centers this fiscal year in Toronto and Houston and two centers by March 1993 in Rome and Madrid.

NEC's European Technology Center, established last October in Dusseldorf, Germany, to make ASICs for the European market, will release its first product, an 8-bit microcontroller to be used in mobile communications applications, this fall.

By the end of fiscal 1992, NEC said, it expects to invest $23.08 million in the research and development center, which hopes to triple its employee roster by 1995. Sasaki said future plans call for designing ASICs for cordless telephones and automobiles.

Valigra is the Tokyo bureau chief for the IDG News Service.

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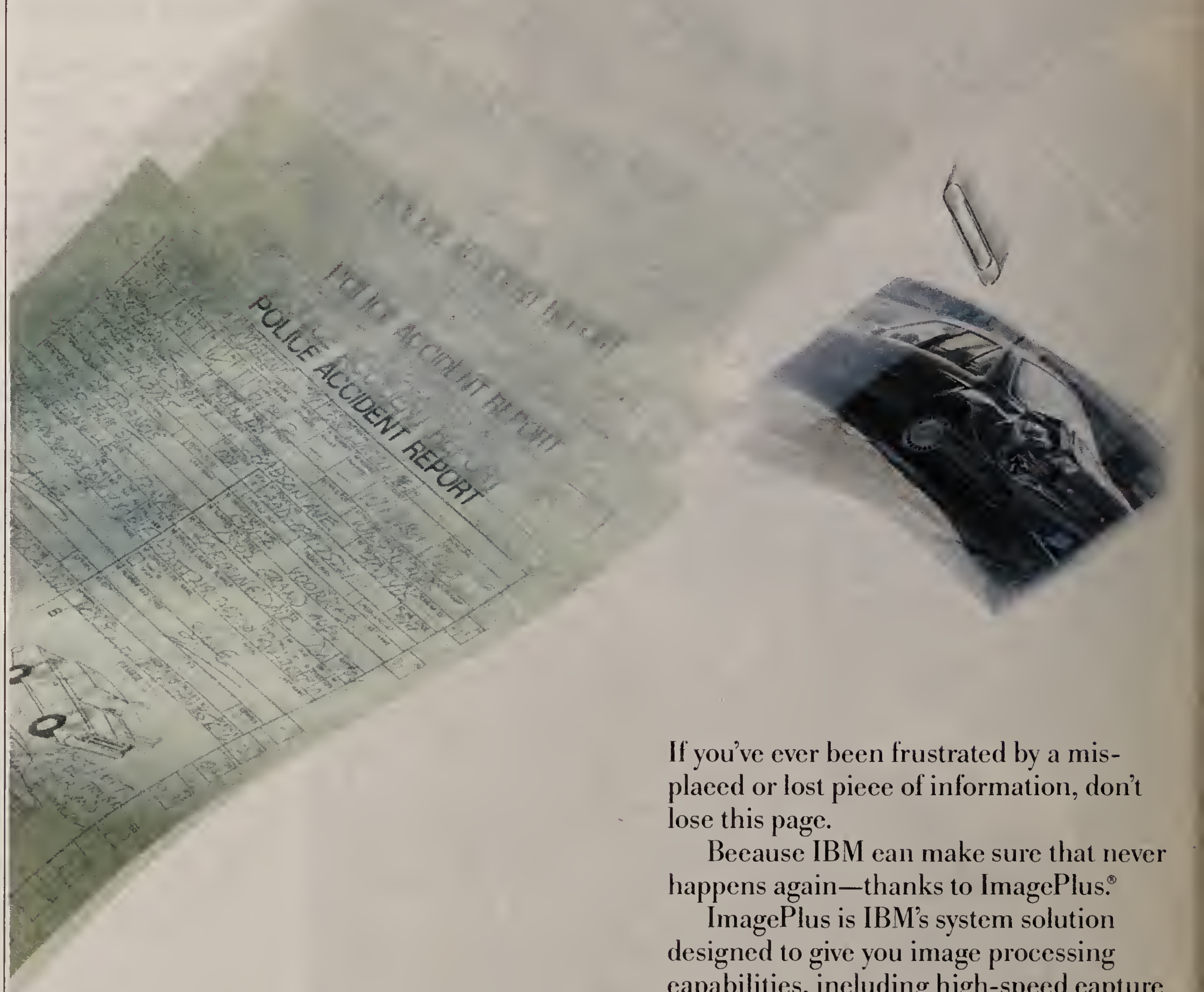

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EXECUTIVE CORNER

Kiger captains Microterm manufacturing team

St. Louis-based computer terminal manufacturer **Microterm** has a new president: **Stanley L. Kiger.** After coming to Microterm in 1990 from Stardent Computer, Inc., Kiger served as vice president of sales until his promotion to the 15-year-old firm's presidency late last month.

Alpha Microsystems announced late last month the appointment of Chief Executive Officer **Clarke E. Reynolds** to the additional office of chairman of the board. Reynolds replaces cofounder **Robert B. Hitchcock**, who resigned from both the chairmanship and the Alpha Microsystems board.

Franchon M. Smithson, vice president of corporate development at **Legent Corp.**, has been appointed to the additional post of chief financial officer at the Vienna, Va.-based systems software and services vendor. In his new capacity, Smithson — who returned to Legent after a brief stint as vice president and treasurer at Computerland Corp. — will be responsible not only for all financial reporting functions of the firm but also for its MIS and corporate services groups. He replaces Arthur F. Knapp Jr.

Washington, D.C.-based **Computer Law Association** heads into the summer with a new slate of officers and directors in place. Leading the approximately 1,400-member international association are newly elected President **Oliver R. Smoot** in Washington, D.C.; Vice President **Edward F. Langs** in Southfield, Mich.; and Secretary/Treasurer **Mark L. Gordon** in Chicago.

Networking and computer I/O products vendor **Xylogics, Inc.** elected **Frank J. Pipp** chairman of the board late last month. Pipp, who has been serving as a board member, replaces **Bruce Bergman**, who will continue to man the posts of president and CEO at the Burlington, Mass.-based firm.

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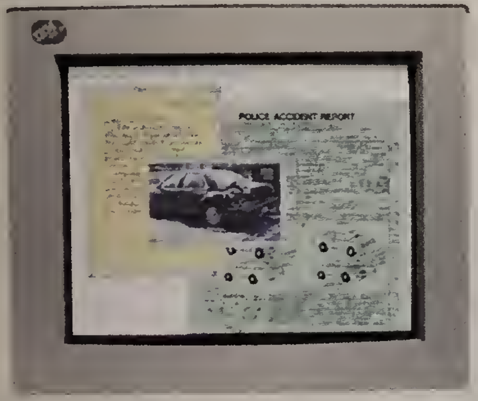

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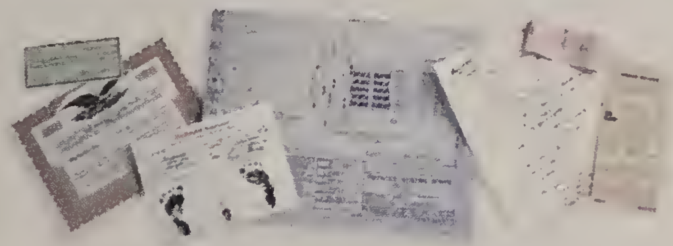

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UK firm buys out Nokia Data

BY DON RADOLI
SPECIAL TO CW

OSLO — Great Britain's International Computers Ltd. (ICL) has announced that it will acquire Nokia Data Systems for $391 million. The cash and stock deal, consisting of $85 million in cash and $306 million in preferred stock, is expected to be formally completed by Sept. 30. In addition, Finland's Nokia conglomerate, which owns Nokia Data, will take a 5% stake in ICL at the time of flotation.

Although ICL Chairman and Chief Executive Officer Peter Bonfield and Nokia Data President and Chief Operating Officer Kalle Isokallio downplayed the role of Fujitsu Ltd. in the takeover, industry observers said Fujitsu had a hand in the deal.

The merging of Nokia Data and ICL will result in an expanded European computer company with a total of 24,000 employees and some $4 billion in revenue.

"The merger will place the new company in the top three [computer firms] in the UK, Finland, Sweden and Denmark and together with its majority shareholder, Fujitsu, in Spain," Bonfield said. "It significantly strengthens ICL's market position in Germany, France and Holland. This move is an important one."

Better left unsaid

Perhaps more important is what Bonfield and Isokallio did not say. First, they did not want to comment on Fujitsu's role in the takeover. The move is bound to be interpreted as a Japanese attempt to acquire European market share and distribution channels.

Second, the move means Nokia Data will have to work out a new arrangement with France's Groupe Bull, whose products it distributes in Finland. Bull is reportedly infuriated that Nokia Data carried out secret negotiations with ICL while also negotiating with Bull.

The Bull/Nokia Data negotiations collapsed after only two weeks. The two companies reportedly had a "gentleman's agreement" not to negotiate with other companies during the five months the negotiations were scheduled to last.

Nokia Data offered a simple explanation for its choice: ICL has the money, while Bull is drowning in a flood of red ink.

Radoli writes for Computerworld Norge, *an International Data Group publication.*

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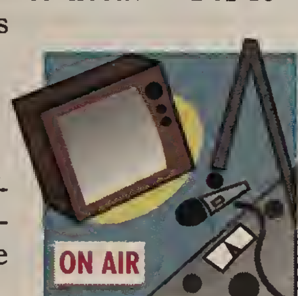
Cable TV is your best IS bet in broadcasting

Cable TV operators and programming providers are becoming hungry for seasoned professionals

BY ALAN RADDING
SPECIAL TO CW

If you're looking for an information systems position in television and have been scanning the major networks, change the channel. The fast-growing cable television companies are where you'll find opportunities.

Although some IS skills are in demand throughout broadcasting, particularly in local-area networking and personal computer-to-mainframe connectivity, the industry is consolidating and retrenching.



Cable TV is an exception, however, and currently offers the most promising entry into the field.

Much of the systems work in TV revolves around the sale of advertising and the scheduling of programs with the help of specialized industry applications.

In cable TV, the IS effort aims at managing and servicing the subscribers. Systems are generally small — primarily minicomputers and PCs — and business knowledge is important.

Individual cable TV systems are typically part of larger multisystems groups. New services, such as pay per view, in which computerized systems turn particular services to subscribers on and off at a moment's notice, add to the IS challenge. Cable TV industry-standard packaged software is used widely.

Large cable TV operators, however, are beginning to develop applications on their own. At Continental Cablevision of New England, which uses the largest of eight Continental data centers, the IS group now develops SQL applications for PCs, reports Bob Tekin, MIS director.

Tekin prefers to hire people with a professional IS background, but "I'm thrilled if I can get somebody with DP and cable experience," he says, because the cable industry is so young. Continental Cablevision of New England employs 18 IS people, three of whom do programming.

IS salaries in cable TV are comparable to those in other similarly sized businesses in the market, says Dave Moore, MIS manager at Continental Cablevision of Michigan, Inc.

IS professionals pull down between $30,000 and $60,000, depending on geographical location, size of the system and level of responsibility.

Another growing segment of the cable TV industry is that of major cable programming providers such as Turner Broadcasting in Atlanta. Turner runs the Cable News Network (CNN), and its IS group runs an IBM mainframe, several Digital Equipment Corp. VAX systems and a Microvax.

CNN's IS department prefers to purchase and enhance applications rather than develop from scratch. PC systems handle market research and analysis, reports Michael Johnson, corporate director of MIS/telecommunications.

Johnson emphasizes business experience in new hiring unless he is hiring for a specific project requiring a particular technical skill. Interpersonal skills are valued: "We work with a lot of diverse groups of users, so it is also important to be able to communicate," he adds.

Major league

Network television — CBS, NBC and ABC — is the major league of the broadcast industry. Here, an IS professional will find the largest IS organizations and the highest pay, although the weak economy has forced the networks to cut back.

Over the past several years, CBS consolidated multiple small data centers into one large data center, reducing staff from 500 people to about 230, reports John Lalli, vice president of MIS operations at CBS, Inc. in New York. During that time, CBS spun off nonbroadcast businesses.

> ALTHOUGH SOME IS skills are in demand throughout broadcasting, the industry is consolidating and retrenching. Cable TV offers the most promising entry into the field.

The CBS data center manages the network's inventory of air time, handles pricing, billing and affiliate payments and supports a network of more than 2,000 terminals and PCs spread throughout the organization.

The company also supports an active application development organization, where a major effort is under way to create a corporatewide data warehouse using SQL and fourth-generation language technology to give users throughout the organization access to a variety of different data, Lalli says.

As a general rule, CBS looks inside for most IS staff. When CBS hires from the outside, it looks for specialized computer skills — particularly CICS, DB2, SQL and telecommunications, according to Lalli.

IS salaries at CBS and the other networks are comparable to IS salaries at the largest Wall Street firms, he reports.

The next level down are the large multisystem cable TV operators and the large conventional broadcast station groups, which have also been hit hard by the recession.

At this level, most companies use minicomputers — particularly IBM System/36s, 38s and Application System/400s, according to John DiFronzo, vice president at Milford, Conn.-based Group W Information Services, which is a division of Westinghouse Broadcasting Co.

PCs and LANs, however, are growing in importance and may present increasingly promising IS career prospects, DiFronzo says.

With an IS staff of 68, down from more than 100, Westinghouse is one of the larger station group IS operations. Salaries are competitive, if not a little better than elsewhere.

Individual stations, at the bottom of the hierarchy, generally use service bureaus or run small PC-based or turnkey minicomputer systems with little need for professional IS staffs.

Radding is a free-lance writer based in Newton, Mass.

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NACCB

Gain management experience

Fast Track is a biweekly column dedicated to answering questions on career directions.

BY STEVE FOGLE
SPECIAL TO CW

Q I've been chief information officer at a Fortune 1,000 firm for the past five years and am ready to make a move. How would you suggest I leverage my 15 years of information systems experience into a new position?

Initials and town withheld

A Obviously, you could take on a new CIO position in a larger and more challenging company, but I would suggest that you investigate other alternatives as well. For example, take on any type of general management responsibility, including running a small company division or assuming some of the duties of your company's chief operating officer. This will help you in your current company or in any future job opportunity.

Q I am a city and regional planner with two master's degrees in civil engineering and urban planning. I'm pursuing a graduate degree in IS in database design. Should I seek a position as a database administrator, stay in the government IS department or become a consultant?

A.S., Dallas

A Spending all of your IS years in government may limit your mobility in the future. After you complete your degree, you may want to make a transition into the corporate world.

Consulting is always an option and may help bridge your government background into industry if you join a generalist firm. However, I would recommend you broaden your IS experience first.

Q I am an independent personal computer network consultant interested in short-term contracts overseas. What kind of market exists for this type of work?

F.M.S., Montvale, N.J.

FAST TRACK
CAREER ADVICE FOR THE '90s

A There is a small market for this work. The best contacts may be from the jobs you have already completed. In addition, get in touch with international trade commissions and agencies in target countries and ask for their insights.

Q I am a student majoring in IS and minoring in finance. I want to work with a New York-based brokerage firm developing trading systems and software. How can I prepare myself?

R.M., New York

A Pursue a summer internship in a brokerage firm. Experience will be the best training. Identify a few people who currently hold entry-level positions in brokerage firms and learn about their backgrounds and how they approached their initial job search. These individuals will be your best sources of information. Keep an open mind with regard to your target industry. Although it is good to have goals, don't limit your opportunities.

Q I'm seeking an associate's degree in IS, but I'm concerned that when I graduate, my Pick systems background will limit prospects for a better-paying position. Where might I find some specialized training to improve my chances?

S.C., Yonkers, N.Y.

A Try finding a firm that is using Pick on a limited basis. This way, you can pick up training on other systems while using your previous experience. Also, finish your associate's degree and then pursue a bachelor's degree in IS. Your compensation will increase as you gain more experience and education.

Fogle is an executive at Korn/Ferry International, a senior-level management search firm based in New York and Los Angeles.

We welcome your questions. Send them to Cathy Duffy, Careers Fast Track, Computerworld, *375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. Your initials and town will be printed unless you request otherwise.*

JOB SNAPSHOT

CASE project leaders

Job Snapshot is a monthly column identifying key attributes of information systems career positions.

▶ **BEST EDUCATION:** *No standard education track has yet emerged for project management in the computer-aided software engineering (CASE) arena. People are coming from all kinds of educational backgrounds (teaching, biology, computer science, mathematics, business, engineering) but usually from disciplines that are based on logical, analytical thought.*

▶ **CAREER PLUSES:** *Many of the career pluses can also be career minuses, based on the fact that this is a position of tremendous exposure in the company. Vice presidents and chief executive officers often monitor projects on a weekly basis, so the project leader may have to provide status reports. CASE project leaders also hold extremely high profiles in the user community. If users are satisfied and the project comes in on time and under budget, the project leader can become a hero.*

▶ **CAREER MINUSES:** *High profile means high risk. If a project does not satisfy users or comes in late and over budget, the fallout can be as bad as the rewards for winning are good. Also, companies are often looking for CASE tools to provide easy solutions. When they don't, the project leader will take the fall. There is little positive feedback until major deliverables are hit. The position typically involves long hours, pressure and stress. CASE tools can easily be misused and huge amounts of money can be spent without goals being realized.*

▶ **BEST JOB OPPORTUNITIES:** *The best job opportunities are generally thought to be in medium to large companies with larger IS staffs and budgets to support sizable investments in CASE tools.*

Areas that are the most extensively involved in CASE include petroleum, banking, insurance, accounting and management consultants.

▶ **REAL WORLD ADVICE:** *CASE project leaders should select companies through careful evaluation: What CASE tools are they using? How are they using them? What stage of the life cycle are they in? Are they using integrated tools? Which ones? Leaders should also learn to speak multiple languages — those of the user community, of developers and of quality assurance staff. Additionally, they should learn as much about the business as possible.*

Researched and written by Kathy Gow, a free-lance writer based in Medford, Mass.

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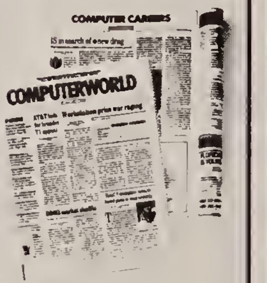

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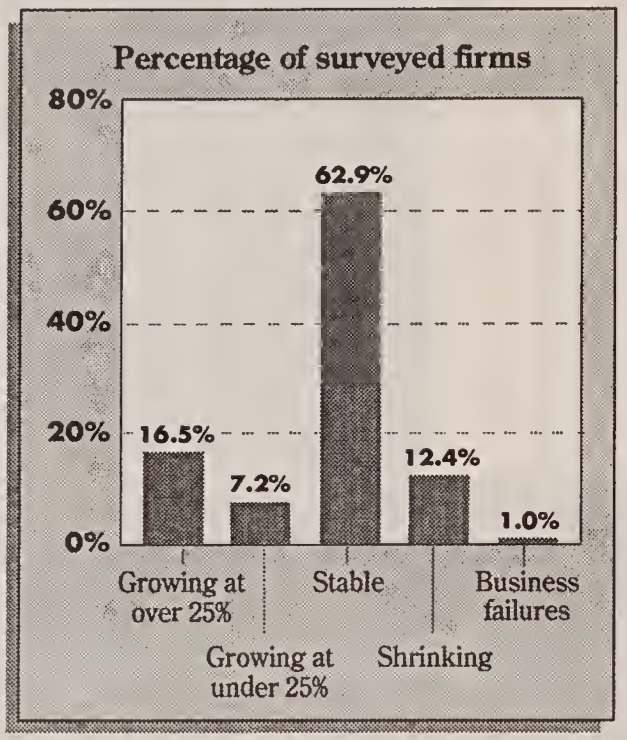

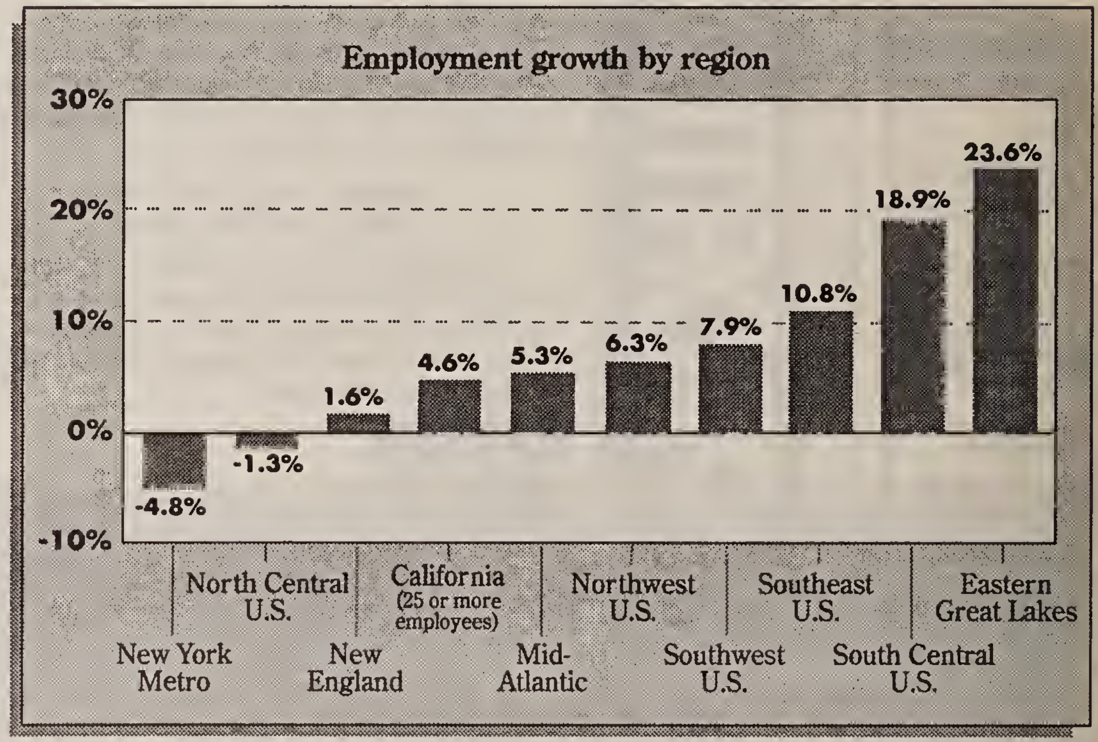

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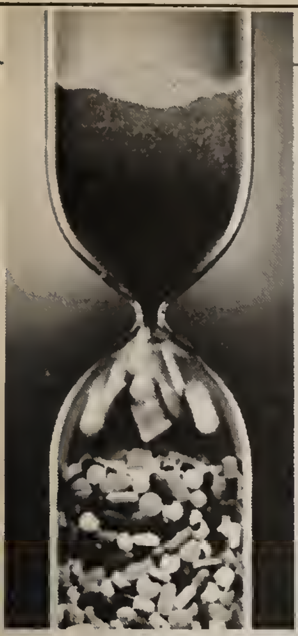

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IS shops can cut costs with third-party fixes

BY ALICE LAPLANTE
SPECIAL TO CW

With the economic heat turned up full blast, savings offered by third-party maintenance vendors can look attractive to information systems shops seeking to trim operating costs.

Very attractive.

IS managers say they can save upward of 50% on annual contracts for large systems by going to a third-party firm rather than IBM, Digital Equipment Corp. or Wang Laboratories, Inc. In addition, managers say, intense competition is spurring third parties to go the extra mile and provide additional services free of charge.

A growing number of well-established maintenance vendors — such as Sorbus, Inc., Comdisco, Inc. and TRW, Inc. — sport solid track records and strong financial balance sheets, making it much less risky these days to sign a third-party contract.

Not only do many such firms offer no-penalty "exit clauses" that allow IS managers to terminate the contract if they are unhappy with the quality of the service, but many also promise to pay the "recertification" costs of putting a leased system back under its manufacturer's official service protection.

Tempting cost savings

The potential savings third-party maintenance providers can offer are enormously appealing. They caused Robert Lopez, telecommunications manager at the Aerospace Division of Fairchild Industries, Inc. in Culver City, Calif., to switch his maintenance contract from IBM to a third-party provider. He estimates that his current contract with Sorbus for his firm's 3081 and 4381 mainframes saves him $16,000 to $24,000 annually.

"IBM still approaches me every year, and I tell them to give me their best shot," Lopez says. "But since the competition is always 10% to 20% lower, I have to say no."

Moreover, Lopez says, Sorbus offers more for that lower price. Lopez's firm gets value-added services such as free installation of new machines and de-installation of older ones, guaranteed caps on annual price increases and contract exit clauses.

Some IS managers say vendors became overly confident of their business and wound up providing shoddy service, which caused customers to look elsewhere.

"IBM became complacent, didn't respond to service calls and didn't have the right technical people in place," says George Tabback, director of corporate IS at Ingersoll-Rand Co. in Woodcliff Lake, N.J. He recently signed a contract with Sorbus, which provides "excellent and responsive service," he says.

At Townecraft, Inc. in Glen Rock, N.J., electronic desktop publishing director Patrick J. Lee says his current maintenance provider — U.S. Computer Maintenance, Inc. — gets malfunctioning systems up and running much faster than his vendor, DEC, ever did. Moreover, his annual costs have been cut in half.

"Sometimes I felt DEC was using our site as a training ground for younger technicians," Lee says.

Resisting temptation

At the other end of the spectrum, many IS managers argue that the manufacturer is the best choice to service a system — even if it costs more. Not only does the vendor know the equipment better than anyone else, but signing the maintenance contract can also further solidify a good vendor/ client relationship.

"I am guaranteed the latest revision levels for boards and system software as well as the highest quality of preventive maintenance," says James S. Kurz, manager of IS at Stanley Magic-Door in Farmington, Conn.

Frank Herriott, IS director at Westminster College in Salt Lake City, continues to sign contracts with Mips Computer Systems, Inc. and Prime Computer, Inc. for the same reason. "I like the comfort factor, and I like the extra attention my vendor gives me for being a good customer."

Beyond today

Moreover, firms that invest in leading-edge technology say they simply don't have a choice: Third-party providers just don't have the expertise to service their equipment.

"We periodically visit with third-party maintenance people to see what they have to offer, but they aren't in a position to maintain a good part of our inventory," says Fred L. Heger, vice president of IS at Southwestern Bell Telephone Co. in St. Louis, which uses IBM and Unisys Corp. as maintenance providers for this reason.

Many IS managers also doubt the financial stability of third-party firms. Sometimes, the best prices are offered by start-ups with no solid customer history. IS managers can take a significant risk by hiring such firms, according to Ivan Gelb, president of Gelb Information Systems Corp., a systems consulting firm in Brooklyn, N.Y. "The financial incentives offered by such organizations can be substantial, but," he asks, "is it worth it?"

At the Hotsy Corp., in Englewood, Colo., IS director David Long stuck with the maker of his system, Prime, to service his CPU, despite tempting offers from third parties. "They just didn't have a track record that made me comfortable," says Long, whose caution turned out to be justified. Of the three third-party firms in his area that work on Prime systems, two have gone out of business, and the third is in a "suspicious" financial state, Long says.

Even satisfied customers of third-party vendors urge caution. Lee visited U.S. Computer's repair facilities as well as some of its customers before deciding the firm was reliable. "Don't sign anything until you've talked to other customers," he advises.

LaPlante is a free-lance writer based in Palo Alto, Calif.

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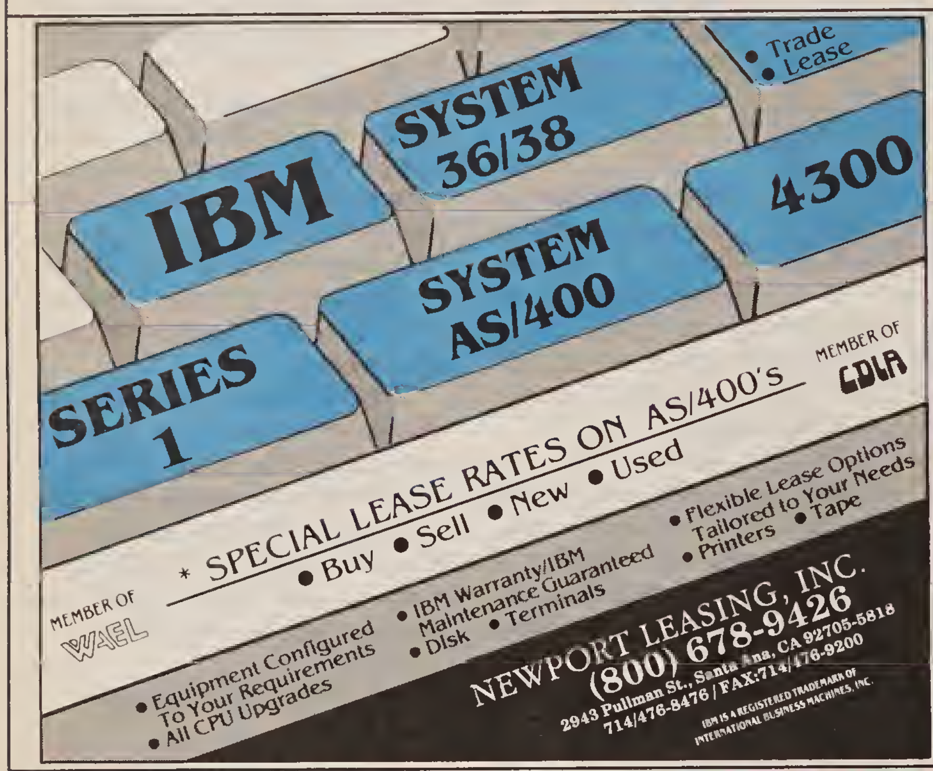

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PS/2 Model 30-286	$1,150	$1,300	$1,000
PS/2 Model 60	$1,300	$1,700	$1,300
PS/2 Model 70P	$3,000	$3,500	$3,000
Compaq Portable II	$750	$1,050	$700
Portable 286	$1,100	$1,350	$1,000
SLT 286	$1,900	$2,200	$1,700
Portable 386	$2,000	$2,100	$1,500
LTE 286	$1,950	$2,200	$1,800
Deskpro 286	$800	$1,000	$700
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DOWNGRADED FROM OUTPERFORM TO MARKET PERFORMER: **Oracle Systems Corp.** (Montgomery Securities). Reason: More conservative sales practices raise concerns about fiscal 1992 earnings. Oracle holds dominant share in independent relational database market, but domestic sales are slow. Company indicated it may seek financial booster in the form of Japanese investment.

UPGRADED FROM MODERATELY ATTRACTIVE TO VERY ATTRACTIVE: **Goal Systems International, Inc.** (Donaldson, Lufkin & Jenrette, Inc.). Reason: Good long-term buy because demand for systems software remains healthy, despite lagging sales of mainframe hardware. Firm's data center management division is a major player in the market and earns 80% of Goal's revenue.

UPGRADED FROM NEUTRAL TO BUY: **Lotus Development Corp.** (Alex. Brown & Sons, Inc.). Reason: New products appear quite competitive and will drive earnings for next few quarters. Freelance 4.0 began shipping last month, and 1-2-3 for Windows is expected to hit the market this summer. Do not expect hefty sales this year of 1-2-3 for the Macintosh, however.

UPGRADED FROM NEUTRAL TO ATTRACTIVE: **Goal Systems** (Mabon, Nugent & Co.). Reason: Recent share price drop creates buying opportunity. Company locked in substantial revenue from recent deal with Banc One Corp. for computer-based training. Financials have remained strong despite Goal's mergers and acquisitions [CW, April 16, 1990].

DOWNGRADED FROM BUY TO NEUTRAL: **Adobe Systems, Inc.** (Alex. Brown). Reason: Company is solid, with superior technology, but it has a tough job ahead penetrating Windows market. Also, weakness in Apple Computer, Inc.'s high-end product sales affects Adobe's royalties and revenue. Apple is selling a lot of printers, but growth comes from its low-end line, based on its own Truetype font technology and not Adobe's Postscript.

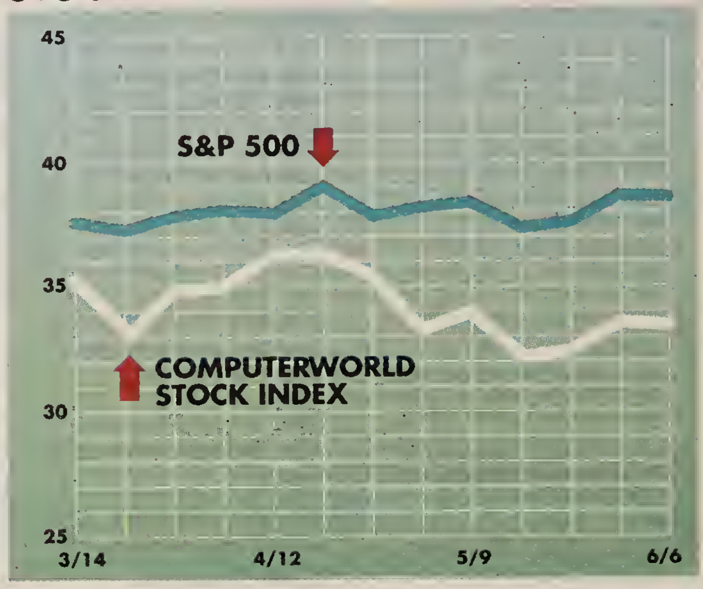
DOWNGRADED FROM BUY TO NEUTRAL: **IBM** (Alex. Brown). Reason: Both mainframe and personal computer markets are saturated. New Enterprise System/9000 mainframes unavailable until the second half of 1991, and bridging strategies have failed to generate interest. Price cuts on low-end RISC System/6000 signal a crowded desktop arena.

UPGRADED FROM HOLD TO BUY: **Marshall Industries** (Prudential Securities, Inc.). Reason: Although prospects for electronics distributors are currently poor, Marshall's earnings look good over the long haul. Stock is currently cheap enough that any negative financial news will not greatly affect its price, but be aware that it is a high-risk proposition. Expect explosive profit growth once economy picks up.

UPGRADED FROM NEUTRAL TO BUY: **LSI Logic, Inc.** (Alex. Brown). Reason: Big profits should come from an expected surge in orders for Scalable Processor Architecture and reduced instruction set computing chips. Company has hired new managers in the key areas of new products, finance and operations.

KIM S. NASH

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Digital Equipment Corp. unveiled its new open systems strategy last Monday; DEC stock slipped ⅜ of a point last week, closing Thursday at 66⅜. Meanwhile, Unisys Corp., which announced impending staff cuts, gained ½ of a point to 4⅜, up nearly 13% for the week.
- After JWP, Inc. said it will take over Businessland, Inc., shares in the financially troubled retailer gained ⅛ of a notch to 1⅛; JWP dropped 1¼ points to 17⅛. Elsewhere on the retail scene, Intelligent Electronics, Inc., which four weeks ago unveiled plans to acquire Bizmart, Inc., jumped 1½ points last week to 23, while Bizmart slipped ⅛ of a point to close Thursday at 16⅜.
- Among semiconductor issues, Texas Instruments, Inc. picked up 1⅛ points to 38⅝, while Motorola, Inc. stumbled ½ of a point to 68½.
- Elsewhere, action was mixed. IBM fell 1⅜ points to 103; Lotus Development Corp. declined 2½ points to 32½; Knowledgeware, Inc. tumbled 5¼ points to 27¼.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, JUNE 7, 1991

TOP PERCENT GAINERS

Alliant Computer Sys.	28.57
Oracle Systems	23.33
On Line Software Int'l	16.18
American Software Inc.	15.31
Ashton Tate	12.66

TOP PERCENT LOSERS

Micropolis Corp.	-26.09
MAI Systems Corp.	-20.00
Knowledgeware Inc.	-17.11
Datapoint Corp.	-14.29
Compression Labs Inc.	-14.29

TOP DOLLAR GAINERS

American Software Inc.	1.88
Oracle Systems	1.75
Comshare Inc.	1.63
On Line Software Int'l	1.38
System Software Assoc.	1.25

TOP DOLLAR LOSERS

Aldus Corp.	-8.50
Knowledgeware Inc.	-5.63
Motorola Inc.	-4.63
Xerox Corp.	-4.38
IBM	-4.38

Communications and Network Services — Off 2.69%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
OTC	19.00	5.38	3 COM Corp.	8.88	0.25	2.90
NYS	69.75	52.50	American Info Techs Corp.	56.88	-3.50	-5.80
NYS	44.13	29.00	AT&T	36.38	-0.75	-2.02
OTC	6.00	0.88	Artel Communication Corp.	2.38	0.00	0.00
NYS	56.25	39.50	Bell Atlantic Corp.	44.63	-2.50	-5.31
NYS	57.00	47.00	Bellsouth Corp.	47.38	-2.50	-5.01
NYS	44.00	13.13	Cabletron Systems	35.75	-2.50	-6.54
OTC	25.88	8.25	Compression Labs Inc.	17.25	-2.88	-14.29
OTC	5.13	2.75	Data Switch Corp.	3.63	-0.13	-3.33
NYS	26.13	8.88	Digital Comm. Assoc.	16.38	-1.25	-7.09
OTC	25.25	12.25	Dynatech Corp.	19.75	0.00	0.00
OTC	12.88	5.50	Fibronix Int'l Inc.	8.63	-0.38	-4.17
OTC	4.00	1.75	Gandalf Technologies Inc.	3.25	-0.13	-3.70
NYS	4.25	1.63	General Datacomm Inds.	3.13	-0.13	-3.85
NYS	33.50	23.50	GTE Corp.	29.38	-0.63	-2.08
NYS	63.00	40.25	ITT Corp.	61.50	-0.38	-0.61
OTC	44.13	17.88	MCI Commmunications Corp.	29.63	-1.88	-5.95
OTC	11.25	2.75	Microcom Inc.	6.13	-0.50	-7.55
NYS	10.38	4.00	Network Equipment Tech.	9.50	0.63	7.04
OTC	14.63	4.00	Network General	8.00	0.50	6.67
OTC	15.50	8.13	Network Systems Corp.	13.75	0.63	4.76
NYS	37.75	22.13	Northern Telecom Ltd.	37.25	-0.25	-0.67
OTC	58.50	17.25	Novell Inc.	53.25	-3.75	-6.58
NYS	89.00	67.00	Nynex Corp.	69.00	-2.88	-4.00
NYS	47.50	36.25	Pacific Telesis Group	39.50	-1.25	-3.07
ASE	15.38	4.75	Penril Corp.	14.50	0.00	0.00
NYS	29.00	8.88	Scientific Atlanta Inc.	13.75	0.00	0.00
NYS	58.88	47.25	Southwestern Bell Corp.	49.75	-2.00	-3.86
NYS	44.75	20.63	United Telecom	27.88	-1.00	-3.46
NYS	40.75	32.38	U S West Inc.	35.63	-1.13	-3.06

Computer Systems — Off 2.02%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
OTC	8.75	0.56	Alliant Computer Sys.	1.13	0.25	28.57
ASE	18.88	10.00	Amdahl Corp.	16.25	-0.38	-2.26
OTC	73.25	24.25	Apple Computer Inc.	46.13	-0.88	-1.86
OTC	11.25	4.25	Archive Corp.	7.13	-0.13	-1.72
OTC	32.75	7.50	AST Research Inc.	23.00	-0.50	-2.13
NYS	8.38	4.00	Bolt, Beranek & Newman	8.38	0.50	6.35
NYS	21.63	4.50	Commodore Int'l	15.50	-1.00	-6.08
NYS	74.25	34.38	Compaq Computer Corp.	36.75	-1.38	-3.61
OTC	2.13	0.13	Computer Automation Inc.	1.13	-0.13	-10.00
NYS	20.00	6.75	Control Data Corp.	11.50	0.00	0.00
NYS	20.88	8.38	Convex Computer	17.00	-2.00	-10.53
NYS	50.38	20.00	Cray Research Inc.	36.38	1.13	3.19
NYS	18.13	3.50	Data General Corp.	16.25	-0.38	-2.26
NYS	3.25	0.75	Datapoint Corp.	1.50	-0.25	-14.29
OTC	30.63	8.25	Dell Computer Corp.	25.13	0.38	1.52
NYS	90.38	45.50	Digital Equipment Corp.	67.00	-2.63	-3.77
NYS	36.13	13.75	Harris Corp.	26.50	-0.38	-1.40
NYS	55.13	24.88	Hewlett Packard Co.	51.38	-3.13	-5.73
NYS	139.75	96.25	IBM	102.00	-4.38	-4.11
OTC	13.50	7.75	Information Int'l	8.25	0.00	0.00
OTC	31.50	10.50	Intergraph	29.25	-0.50	-1.68
NYS	2.75	0.50	MAI Systems Corp.	0.50	-0.13	-20.00
NYS	149.75	114.00	Matsushita Electronics	118.50	-3.50	-2.87
OTC	26.00	9.00	Mentor Graphics Corp.	16.88	-1.13	-6.25
NYS	105.88	44.50	NCR Corp.	104.88	-0.88	-0.83
OTC	32.50	11.00	Pyramid Technology	25.75	1.25	5.10
OTC	34.00	9.75	Sequent Computer Sys.	14.25	-0.88	-5.79
NYS	47.25	18.00	Silicon Graphics	33.00	-0.50	-1.49
NYS	37.25	14.63	Stratus Computer Inc.	32.38	-0.75	-2.26
OTC	38.63	15.00	Sun Microsystems Inc.	36.25	-0.63	-1.69
NYS	25.63	8.88	Tandem Computers Inc.	16.00	-1.38	-7.91
NYS	39.50	23.50	Tandy Corp.	33.00	-0.63	-1.86
OTC	29.50	6.75	Teradata	16.13	-1.13	-6.52
NYS	7.88	1.38	Ultimate Corp.	5.25	0.25	5.00
NYS	15.50	1.75	Unisys Corp.	4.13	0.25	6.45
ASE	5.75	2.00	Wang Labs Inc. (b)	3.50	0.00	0.00

Software & DP Services — Off 0.90%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
OTC	63.00	17.00	Adobe Systems Inc.	48.25	-2.25	-4.46
OTC	13.50	7.00	Aicorp	7.50	-0.25	-3.23
OTC	59.88	20.25	Aldus Corp.	45.50	-6.50	-12.50
OTC	28.50	12.00	American Mgmt. Systems	25.50	-1.75	-6.42
OTC	18.25	7.50	American Software Inc.	14.13	1.88	15.31
NYS	4.63	1.38	Anacomp Inc.	3.25	-0.13	-3.70
OTC	23.50	10.00	Analysts Int'l	16.00	0.50	3.23
OTC	13.25	4.88	Ashton Tate	11.13	1.25	12.66
OTC	10.25	4.00	ASK Computer Sys.	8.38	0.50	6.35
NYS	37.00	22.63	Auto Data Processing	32.00	-2.00	-5.88
OTC	60.25	32.00	Autodesk Inc.	58.00	-0.63	-1.07
OTC	31.50	18.50	BGS Systems Inc.	28.00	1.00	3.70
OTC	43.88	17.75	BMC Software Inc.	39.25	0.50	1.29
OTC	21.50	11.00	Boole & Babbage Inc.	11.00	-1.75	-13.73
OTC	64.25	14.50	Borland Int'l	50.63	-1.13	-2.17
NYS	9.00	0.44	Businessland Inc.	1.13	0.00	0.00
OTC	20.88	5.13	Cognos Inc.	15.50	-0.25	-1.59
NYS	18.63	4.38	Computer Associates	9.38	-0.38	-3.85
OTC	17.75	9.50	Computer Horizons	10.50	0.25	2.44
NYS	73.25	36.75	Computer Sciences	65.75	0.00	0.00
NYS	11.75	6.63	Computer Task Group	8.38	-0.88	-9.46
OTC	25.25	13.00	Comshare Inc.	19.63	1.63	9.03
OTC	16.00	3.75	Corporate Software	10.38	-0.25	-2.35
NYS	49.00	27.88	General Motors E (EDS)	48.75	0.88	1.83
OTC	18.75	7.25	Goal Systems Int'l	14.25	0.75	5.56
OTC	7.00	1.88	Hogan Systems Inc.	5.88	-0.25	-4.08
OTC	23.63	7.75	Information Resources	20.63	-2.50	-10.81
OTC	17.50	2.63	Informix Corp.	5.75	-0.50	-8.00
OTC	7.88	1.38	Intellicorp Inc.	1.63	-0.06	-3.73
OTC	8.25	2.50	Interleaf Inc.	6.38	0.00	0.00
OTC	15.88	6.88	Intersolv	9.25	0.00	0.00
OTC	43.25	10.00	Knowledgeware Inc.	27.25	-5.63	-17.11
OTC	45.00	16.75	Legent Corp.	32.25	1.25	4.03
OTC	39.25	12.50	Lotus Development	32.25	-3.75	-10.42
OTC	32.00	13.63	Micrografx	15.00	-0.75	-4.76
OTC	117.50	50.75	Microsoft Corp.	110.25	0.50	0.46
NYS	10.50	4.00	On Line Software Int'l	9.88	1.38	16.18
OTC	24.00	4.88	Oracle Systems	9.25	1.75	23.33
NYS	14.63	7.00	Pansophic Systems	12.13	-0.50	-3.96
OTC	9.25	1.25	Phoenix Technologies	7.50	-0.50	-6.25
NYS	52.00	33.38	Policy Management Sys.	48.25	-0.63	-1.28
NYS	23.63	11.50	Reynolds & Reynolds	22.63	0.25	1.12
OTC	25.75	14.75	SEI Corp.	25.75	0.25	0.98
OTC	22.75	12.50	Shared Medical Systems	20.38	-0.38	-1.81
OTC	35.25	12.00	Software Publishing Corp.	19.50	-0.75	-3.70
NYS	14.63	5.50	Sterling Software	13.50	0.00	0.00
OTC	26.00	9.50	Sungard Data Sys.	17.50	0.25	1.45
OTC	55.88	17.75	Symantec Corp.	41.38	-2.63	-5.97
NYS	24.50	4.50	System Center Inc.	8.88	-0.13	-1.39
OTC	37.25	12.50	System Software Assoc.	15.00	1.25	9.09
OTC	24.88	4.75	Weitek	11.25	-1.25	-10.00

Semiconductors — Off 6.03%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
NYS	14.25	3.63	Advanced Micro Devices	13.00	-0.50	-3.70
NYS	12.50	5.50	Analog Devices Inc.	10.25	-0.75	-6.82
OTC	21.75	5.25	Chips & Technologies	8.88	-0.88	-8.97
OTC	59.25	28.00	Intel Corp.	52.25	-3.50	-6.28
NYS	13.00	5.13	LSI Logic Corp.	9.63	-0.88	-8.33
NYS	19.13	6.75	Micron Technology	15.63	-1.00	-6.02
OTC	20.88	7.25	MIPS Computer Systems	15.38	-1.25	-7.52
NYS	88.38	45.75	Motorola Inc.	66.63	-4.63	-6.49
NYS	8.38	3.00	National Semiconductor	6.63	-0.38	-5.36
NYS	47.63	22.50	Texas Instruments	37.75	-1.38	-3.51
OTC	12.25	3.00	VLSI Technology	9.63	-1.00	-9.41
ASE	14.88	4.00	Western Digital Corp.	4.63	0.00	0.00

Peripherals & Subsystems — Off 4.69%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
OTC	2.75	0.88	Apertus Technologies	1.94	-0.31	-13.87
OTC	23.50	7.50	Banctec Inc.	13.25	-0.50	-3.64
OTC	17.50	4.25	Cambex Corp.	11.88	-1.38	-10.38
ASE	11.75	4.13	Cognitronics Corp.	9.25	-0.38	-3.90
NYS	31.25	14.63	Conner Peripherals	19.25	-1.75	-8.33
ASE	22.00	7.00	Dataram Corp.	11.88	-0.13	-1.04
NYS	13.00	4.25	EMC Corp.	10.88	-0.50	-4.40
NYS	47.25	33.75	Eastman Kodak Co.	42.75	0.38	0.88
OTC	11.25	4.75	Emulex Corp.	8.88	0.13	1.43
OTC	32.25	14.00	Evans & Sutherland	19.50	-0.75	-3.70
OTC	6.50	3.88	Iomega Corp.	5.50	0.00	0.00
OTC	28.25	6.75	IPL Systems Inc.	23.75	0.50	2.15
OTC	1.63	0.13	Masstor Systems	0.75	0.00	0.00
OTC	16.00	2.63	Maxtor Corp.	4.25	0.13	3.03
OTC	18.00	4.38	Micropolis Corp.	10.63	-3.75	-26.09
NYS	95.63	73.63	3M Corp	93.00	-2.25	-2.36
OTC	14.25	6.00	Printronix Inc.	6.50	-0.75	-10.34
NYS	24.75	8.50	QMS Inc.	19.75	-2.63	-11.73
OTC	18.25	8.25	Quantum Corp.	11.25	-0.63	-5.26
NYS	7.63	4.38	Recognition Equipment	7.38	0.00	0.00
OTC	11.50	4.00	Rexon Inc.	9.50	-0.50	-5.00
OTC	19.88	5.63	Seagate Technology	10.50	-0.88	-7.69
NYS	47.00	11.00	Storage Technology	43.50	-1.00	-2.25
OTC	4.75	1.25	Tandon Corp.	3.38	-0.31	-8.49
NYS	26.38	11.63	Tektronix Inc.	23.88	1.25	5.52
OTC	0.56	0.16	Televideo Systems	0.34	-0.03	-8.27
NYS	60.13	29.00	Xerox Corp.	53.63	-4.38	-7.54

Leasing Companies — Off 0.19%

Exch	52-Week	Range		June 7 Close	Wk Net Change	Wk Pct Change
OTC	16.25	7.00	Amplicon Inc.	16.25	0.25	1.56
NYS	28.38	14.63	Comdisco Inc.	24.75	0.00	0.00
OTC	16.25	9.25	LDI Corporation	14.63	-0.38	-2.50
OTC	5.75	2.25	Selecterm Inc.	3.75	0.00	0.00

NOTE: Contel Corp. was acquired by GTE Corp. and removed from the list.

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Multimedia boost added to Apple's System 7.0

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. added a multimedia booster to its System 7.0 operating system engine last week when it introduced Quicktime, a software extension designed to make the integration of sound, video and animation into Macintosh applications more affordable and accessible.

Quicktime consists of four major components — systems software, file formats, compressors and interface standards — that provide the functional foundation necessary to build multimedia applications. The features allow users to compress and decompress photographic images, play video clips and extend the Macintosh user interface throughout the presentation, Apple officials said.

While Quicktime will work with any of the standard Macintosh II computers, the voracious memory appetite of most multimedia applications will probably require system upgrades. At least 4M bytes (preferably 8M bytes) of random-access memory as well as 160M bytes or more of hard disk space are suggested. Users will also need at least an 8-bit color screen with 640- by 480-pixel resolution and at least 8 bits of digital audio sampling.

Because Quicktime will make multimedia accessible to new segments of users, the package could lead to the creation of applications in virgin areas such as videoconferencing, store-and-forward video mail and low-cost video editing, Apple said.

Quicktime will be distributed as an add-on package until the next major revision of the Macintosh operating systems, which insiders said they expect will arrive next year. Current distribution plans call for a beta-test release of Quicktime to head out to developers this summer and general availability by the end of the year. No price has been set yet for the package.

In related multimedia news, Microsoft Corp. revealed plans to license image compression technology from Xing Technology Corp. Microsoft officials said they plan to use the licensed software in conjunction with their operating system.

Unisys unwraps I486 CTOS

NEW YORK — Unisys Corp. introduced last week an Intel Corp. I486-based version of its CTOS networked computer line composed of plug-in and self-configuring components.

Unisys said the new design will cut down on costs associated with technical support calls from users of these workstations.

The firm unveiled two CTOS workstations.

The $2,995 diskless Supergen Series 2000 uses an Intel 80386SX running at 20 MHz, 2M to 8M bytes of random-access memory and built-in networking.

The $13,995 Supergen 5000 contains an I486 chip running at 33 MHz, 4M to 36M bytes of RAM, a 32-bit bus, a 3½-in., 1.44M-byte floppy disk and a small computer systems interface adapter, among other I/O ports.

Both systems use plug-in cartridges, slide-in drives or slide-in expansion units, and all add-in components are encased in copper-and-nickel-coated plastic to prevent electrostatic discharge damage and to provide ease of handling.

Both of the Supergens support Super VGA video monitors with up to 1,024- by 768-pixel resolution.

Unisys' Supergen 5000-2's *I486-based workstation/server uses plug-in cartridges, slide-in drives or slide-in expansion units*

IBM begins multimedia push

Desktop-to-mainframe strategy to unfold this week and in fall

BY MICHAEL FITZGERALD
CW STAFF

IBM plans a multimedia product announcement this week that represents the first pieces of its commitment to a broad, desktop-to-mainframe multimedia strategy that will take fuller shape in the fall.

"[Multimedia] is one of the top half-dozen corporate strategies stated in the 1990s," said Peter Blakeney, manager of market programs, multimedia and education at IBM in Atlanta.

"The reason that it is so important is that as you add these functions — video, image, animation, sound and different user interfaces which are collectively called multimedia — those technologies allow IS technology to be deployed in a vastly larger set of opportunities."

John Dunkle, vice president of Workgroup Technologies, Inc. in Hampton, N.H., said IBM is pointing toward the fall announcement to define its multimedia direction.

The products due on Wednesday, part of a general personal computer announcement (see story page 1), include two multimedia kits directed at training and desktop presentations: the 8516 Touch Display, a touch-screen IBM Video Graphics Array monitor radically different from IBM's current Infowindow touch-screen monitor, and a 128M-byte 3½-in. rewritable optical disc drive. There will also be an Information Delivery System, essentially a Personal System/1 with a compact disc/read-only memory drive added to it, that will serve as IBM's low-end multimedia platform, and a device that will let users access information they may not be able to manipulate on their own systems.

The kits will work on all Personal System/2 models with the Micro Channel Architecture bus or anything above a Model 50. They mix current technology with new products at a price lower than what the pieces would cost separately. The training-oriented kit includes IBM's M/Motion video card, a laser disc player and audio speakers, all in existence today. The kit for desktop presentations has IBM's M/Audio sound recording card and the new optical disc drive. Blakeney said IBM would follow this marketing approach with future releases.

IBM is working for an August introduction of enhanced Digital Video Interactive capabilities. It will follow this with a major announcement late in the third quarter. Sources said this will include a fully integrated multimedia PC and packaged peripherals and software aimed at the manufacturing and education markets; other possibilities are being discussed.

Tim Bajarin, executive vice president of Creative Research Strategies International, Inc. in Santa Clara, Calif., said IBM will need to work with strategic partners in a variety of areas, including data compression and communications, to make the strategy work.

> "THIS IS THE first time I've seen [IBM] attack a concept correctly, really embrace it and as a result develop the right technologies and strategies to make it happen."
>
> TIM BAJARIN
> CREATIVE RESEARCH STRATEGIES

But, he added, "I've been watching [IBM] work for many years, and this is the first time I've seen them attack a concept correctly, really embrace it and as a result develop the right technologies and strategies to make it happen."

Unisys leasing arm tackles $3.8B debt

BLUE BELL, Pa. — In a move designed to pare its $3.87 billion debt, Unisys Corp.'s leasing arm last week sold lease receivable-backed certificates for $131 million in cash.

The transaction for the Unisys Credit Corp. certificates was conducted privately by Unisys Finance Corp. in Detroit.

According to a Unisys spokesman, the sale to approximately 40 undisclosed investors gives the buyers fractional ownership in the leasing company's trust property, which includes future payments due from customers and related rights and interests.

With the lease certificate sale, Unisys was able to announce that its debt reduction program, begun early last year, has netted more than $300 million. Unisys has said its debt reduction target this year is $600 million.

AT bus

FROM PAGE 1

technology on the desktop," according to Michnoff. The goal was to create a new standard that was difficult to clone without permission.

At Dow Chemical Co.'s research and development arm, MCA is a tough sell. While MCA is a faster bus than the AT, there are not enough applications to take advantage of it to justify the additional cost for the bus, group leader Terry Frazier said. His users prefer the AT bus, which is one reason he buys more AT bus Compaq Computer Corp. PCs than IBM boxes.

MCA will be used in the PS/2 Model 57 SX, which will be positioned as IBM's 386SX high end. It will also be the first machine from a major PC vendor to feature a 2.88M-byte floppy disk drive, doubling the 1.44M-byte capacity common today, several sources confirmed.

IBM would not comment on the specifics of the products other than to confirm a Wednesday announcement.

This dual bus strategy may only increase users' anxiety levels. With a nonhomogeneous bus environment, end-user sites face more hassles in tracking machine types and card inventories and in training internal support people.

"There's too much difficulty maintaining two sets of network cards and add-in boards," said Stephen Anderson, information systems architect at the Department of Social and Health Services for the state of Washington.

Diskless Model 35

The PS/2 Models 35 and 40 will each offer 40M- or 60M-byte hard disk drives and 16-bit Video Graphics Array adapters. The Model 35 LS will be a diskless version of the Model 35.

The Models 35 and 40, which differ only in number of expansion slots and drive bays, will be priced starting at just under $3,000, sources said.

The Model 57 SX will range in price from $3,000 to $6,000, depending on hard disk drive capacity, which ranges up to 320M bytes.

NEWS SHORTS

PC cuts roll along

Following an across-the-board price cut in April, Toshiba America Information Systems, Inc. has taken the ax to prices on its T1000XE and T1000SE notebook personal computers again. The Intel Corp. 8086-based PCs will now cost $1,399 and $999, respectively. Everex Systems, Inc. and Hewlett-Packard Co. last week joined the price war that has gripped IBM, Compaq Computer Corp., Dell Computer Corp. and others. Everex cut prices 18% to 33% on all Step desktop PCs and 13% to 25% on Tempo desktop models. HP trimmed prices on its Vectra PCs by up to 10% and on storage by up to 33%.

. . . .

NFSnet goes commercial

Advanced Network & Services, Inc. (ANS), the consortium that manages the National Science Foundation's NSFnet, announced last week that it will open the high-speed government and education backbone to commercial users. The commercial NSFnet service will be provided by the recently formed ANS subsidiary, ANS CO+RE Systems, Inc. Profits from the service will be used to improve NSFnet's infrastructure, said Allan H. Weis, president and chief executive officer of ANS. Nonprofit customers will pay less than commercial customers for NSFnet use, he added. Likely customers for the new service include information services, computer companies and contractors that want to communicate with government and research groups, Weis said.

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Apple cuts from the top

Top Apple Computer, Inc. executives can expect to have their pay slashed by as much as 10% as part of a broad cost-cutting program the firm recently adopted, according to an internal company newsletter. Last year, Apple's five highest paid executives earned nearly $10 million in salaries and bonuses. Daycare services, company cars and some fitness centers may also fall under the cost-cutting ax, an Apple spokeswoman said. The company recently announced plans for widespread belt-tightening measures that include the elimination of about 1,560 jobs, or about 10% of its work force.

. . . .

U.S., Japan limit super sales

The U.S. and Japan agreed to tighten their export controls to prevent supercomputers sold abroad from being used to develop nuclear weapons and missiles, the White House announced late last week. Strict safeguards — such as inspection of software programs — will be imposed on supercomputers exported to countries that "pose a national security or [nuclear] proliferation concern," and some export applications may be denied, spokesman Marlin Fitzwater said.

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U.S. Privacy Council formed

Several leading privacy advocates last week formed the U.S. Privacy Council to promote stronger privacy rights for consumers in the computer age. The Washington, D.C.-based council plans to focus on such topics as credit reports, caller identification services, privacy-enhancing technologies, lobbying for a federal data protection board and helping U.S. firms adhere to the Code of Fair Information Practices. Leaders include Evan Hendricks, publisher of "Privacy Times" newsletter, and Marc Rotenberg, director of the Washington, D.C., office of Computer Professionals for Social Responsibility.

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Thinking Machines claims title

Thinking Machines Corp., a pioneer in the area of massively parallel computing, last week introduced its newest Connection Machine, a 100-user supercomputer with a peak speed of 40 billion floating-point operations per second. According to the firm, the CM-200 is the first supercomputer with an operating environment — dubbed CMOST, for Connection Machine Operating System: Timesharing — built on standard X Window System and Motif protocols for workstations. Cambrige, Mass.-based Thinking Machines also introduced a standalone version of CMOST for Sun Microsystems, Inc.'s workstations to let users become familiar with parallel programming techniques at their workstations.

AT&T cashes in on departure from Sun

BY NELL MARGOLIS
CW STAFF

AT&T's divestiture of most of its 19.1% stake in Sun Microsystems, Inc. last week will likely have no effect on the rival Unix alliances the original AT&T/Sun relationship sparked to life, according to analysts.

"If this move had come several years ago, it might have had a striking impact on OSF," said Judith Hurwitz, vice president of the Seybold Office Computing Group in Boston. The Open Software Foundation (OSF), a Cambridge, Mass.-based consortium, is developing a Unix operating system that will compete with Sun's. It was originally mounted to prevent the Sun/AT&T combination from essentially locking all other comers out of the promising Unix market.

However, Hurwitz noted, "Things have gone way beyond the catalyst stage, now." Paul Cubbage, an analyst at San Jose, Calif.-based market research firm Dataquest, Inc., said the OSF has become a player in its own right. "They've established a whole new way of doing a whole new kind of business," he said.

As for Sun, he said, "They got the financing [from AT&T] when they needed it. They don't really need it any more."

Earlier this spring, as its prospects of buying NCR Corp. brightened, AT&T spun off subsidiary Unix System Laboratories, Inc. (USL) to 11 computer vendors, including Sun. Last week's stock sell-off, analysts said, was a natural follow-up to the USL spin-off, both of which allow AT&T to approach the altar with NCR unfettered by old, competitively awkward ties.

The telecommunications giant will pocket a pretax gain of about $137 million from the transaction, under which Sun will repurchase some 5 million of AT&T's shares at $36.25 per share. New York-based investment banker Salomon Brothers, Inc. will buy most of the remainder for resale to institutional investors.

"This is simply a very pragmatic move," Hurwitz said. "AT&T can take its money out of Sun and invest it in the development that NCR needs to do."

Prime trumpets tools for 50 series

BY SALLY CUSACK
CW STAFF

SAN ANTONIO — Declaring undying devotion to proprietary systems customers, Prime Computer, Inc., announced several products for its 50 series at the National Prime User Group (NPUG) meeting here last week.

"We feel great," said Cathy Van Orman, chairwoman of NPUG. "Prime is finally moving ahead of customer needs. Users are telling me that instead of trying to get Prime to respond to problems, they are trying to figure out which sessions will teach them the most."

The highlight of the conference was an announcement by Prime officials that, for the first time, Prime's Pick-like relational database, Information, would be available to run on Unix-based hardware from IBM and Digital Equipment Corp. sometime in the third quarter of this year.

Initial conversions have already been completed for the IBM RISC System/6000 workstation, and engineering testing is already in progress. More than two-thirds of Prime's proprietary installed base use Information.

Information's sales

According to Richard Snyder, president of Prime's computer systems business unit, Prime's Information accounted for 50% of 1990's fourth-quarter sales and 60% of 1991's first-quarter sales revenue.

Other product announcements included the following:

- Hyper Session, a Microsoft Corp. Windows-based product that takes data from host-based Information files and transfers it into personal computer applications such as Lotus Development Corp.'s 1-2-3 and Microsoft's Excel.
- Redundant arrays of inexpensive disk technology demonstrated at the conference and slated to be introduced formally sometime later this year.
- Plans to port the Computervision Medusa computer-aided design and drafting software to the Prime EXL 7000 series of Unix-based multiprocessors. The porting process is scheduled to be completed during the first half of 1992.

"We are also designing a multiprocessor based on Mips [Computer Systems, Inc.] technology," Snyder said. "This board-swapping type of architecture will preserve 50 series user investments while transitioning to EXL systems."

Jim Bloomquist, a former NPUG technical chairman, applauded Prime's product introductions, noting that the vendor may be able to save 50 series users as much as 85% of their original investments while migrating to Unix.

Referring to 50 series-to-EXL Unix migration, Bloomquist said a major problem exists in convincing chief financial officers of Prime's stability in the financial world.

"The next 24 months will determine whether Prime will survive," said George Weiss, vice president at Gartner Group, Inc., a Stamford, Conn.-based research and consulting firm. "They must react to the market quickly, exploit technology and form alliances."

Bank bailout

FROM PAGE 1

programmers, applications developers and data center and computer operations employees.

Finding new jobs could be a grim task for the dismissed employees. "There are just not many jobs available," said Sara Johnson, a managing economist at DRI/McGraw Hill in Lexington, Mass. The current unemployment rate in the area is 9.6%, and the only industry adding jobs is health care, she said.

However, many of those 850 data center jobs may be preserved because Fleet needs at least two major check processing centers in New England, said Michael R. Zucchini, chief information officer at Fleet.

"Most people expected that the technology areas would be consolidated first, but we felt it was important to announce our intentions to the staff as early as possible so they can play a role in the conversion," Zucchini said. "There is a transition period that gives us some time to help them find other positions, both internally and externally."

Albany upgrades

Zucchini said Fleet has an IBM 3090 Model 720 located in Albany, and that will have to be "substantially upgraded" or supplemented with an additional processor.

The conversion to Fleet's own software systems — a mixture of in-house-developed and commercial applications chosen as a companywide standard — will begin immediately, Zucchini said. The end of 1992 is the target date for all computer operations to be settled in the Albany center.

Ultimately, Fleet will close 60 Bank of New England branches in New England.

Benchmarks get no respect

BY CHRISTOPHER LINDQUIST
CW STAFF

Benchmarking may be pervasive but not persuasive in the marketing of on-line transaction processing (OLTP) systems today, according to a recent survey.

The report by The Standish Group International, Inc. in Hyannis, Mass., said that only 5.1% of the 297 respondents involved in the purchasing of OLTP systems at medium- and large-size companies considered such benchmarks to be "very important" in selecting a "short list" of possible vendors.

Conversely, 38.3% of the respondents rated common OLTP benchmarks as being "not important" in determining their short list.

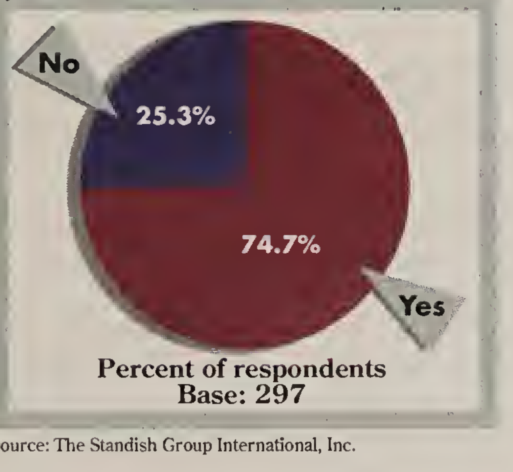
James H. Johnson, chairman of The Standish Group, indicated that he believes benchmarks are a good thing but that it appears users were not consulted sufficiently when the existing benchmarks were designed. "It's almost like they created all these benchmarks, but no one ever went out and said to the user base, 'Gee, what kind of benchmark would you like to see?' "

Interviews with users of OLTP systems corroborated the survey results. Clarence Golson, vice president of technical support at Amsouth Bank NA in Birmingham, Ala., said he believes benchmarking is highly susceptible to errors, adding that his firm prefers to subject systems to a "stress test" of its own applications to determine suitability.

Other users agreed that benchmarking was not a first choice for determining performance. "We look first for comparable data from live environments similar to our own," said Robert L. Tucker, general manager of information resources and technical operations at Key Services Corp. in Albany, N.Y. However, benchmarking is "better than not having any empirical evidence at all," he added.

Thinking bigger

Most users of on-line transaction processing systems are planning new or upgraded systems within the next three years



Percent of respondents
Base: 297

Source: The Standish Group International, Inc.

Some users indicated that in addition to benchmarking, performance is also secondary to the overall functionality of a system in making a buying decision.

When the Student Loan Marketing Association was looking for an OLTP system, connectivity was considered most crucial, said Robert Kramer, director of software development. "The critical thing was the number of networking protocols that it worked with."

Joseph Vincent, director of technology planning at Humana, Inc., concurred: "If the functionality is there, we're willing to compromise somewhat on total transaction processing efficiency," he said. "We have people who are capable enough in the areas of performance and tuning to be able to compensate for inefficiencies in an on-line transaction processing system."

Vincent added that his company had chosen a system based on business needs rather than technical abilities — a sentiment echoed in the report.

The survey also had good news for the makers of Unix-based OLTP systems. According to the report, 23.9% of those users considering the purchase of new OLTP systems within the next three years said that they are planning to purchase new Unix-based systems.

Macs

FROM PAGE 1

Equipment Corp. and IBM are expected to speed the production of DAL-based servers and play a vital role in Apple's scheme to penetrate the corporate world.

Early client/server implementors attending the Management Apple Computers in Information Systems conference in Washington, D.C., last week said the design can make sense out of a multivendor environment.

At the Marshall Flight Center in Huntsville, Ala., chief of management systems Gary Gray has used the client/server model to unite information from a wide variety of hosts, including models from DEC, Data General Corp., Hewlett-Packard Co., IBM and Cray Research, Inc.

"Sometimes, it seems that the only company we don't buy hardware from is John Deere," Gray said. "The trouble is, you have to be an expert to go from system to system."

The center's new design uses a DAL-equipped DEC VAX 4000 as an interface among dozens of Macintoshes and mainframes. The users get the power of the big iron while the data maintains a consistent look, no matter which machine it is from.

Payoffs for a successful client/server installation can often be dramatic. Cozz Wilson, manager of technology services at TRW, Inc.'s headquarters in Cleveland, is replacing an IBM 4300 system with a Macintosh-based distributed PC network. The arrangement is expected to save TRW as much as $175,000 per year in maintenance and depreciation costs, Wilson said. "I'm very high on the client/server model," he said. "There's no doubt the mainframe is an endangered species."

Battle of the glitches

Like many client/server pioneers in the Apple community, Saskatchewan Telecommunications (Sasktel) business manager Bob Novakowski has battled maddening network slowdowns and software glitches while fine-tuning the shift from a mainframe-based system running dedicated terminals to a distributed PC environment.

The Regina, Saskatchewan-based telecommunications company's first shot at implementing a client/server architecture was an unmitigated dud. "Totally unacceptable," the taciturn Novakowski said of the original design, which hooked up desktop Macintoshes to a Macintosh FX server running Acius Corp.'s 4th Dimension database.

Novakowski learned the first rule of client/server strategizing: Be flexible. A revamped server design using an Oracle Corp. database on a DEC Vaxserver 3400 was installed, and Sasktel was back in the fast lane. "It really opened things up," said Novakowski, who now has a cost-effective open architecture that uses a graphics interface to access a traditional database.

Zale

FROM PAGE 1

provide end-user support, including help-desk assistance, to its approximately 1,500 desktop systems and 2,000 stores.

The Zale contract is worth "hundreds of millions of dollars," according to ISSC President Dennie M. Welsh.

"The key thing is that we're moving into a new area — retail sales — that we haven't done a total outsourcing deal in before," Welsh said.

Zale is not the first major retailer to outsource — Brooks Brothers, Addis & Dey, Inc. and Southland Corp., for example, have also opted for outsourcing.

Nevertheless, Douglas Wilder, manager of the systems operations program at market research firm Input, Inc., noted that the retail sector has distinctly lagged behind others such as health care and banking in choosing this route.

"I talked to a guy at Toys R Us, for example, and they see their data systems as absolutely critical to their competitive edge," Wilder said. "No way do they want to outsource. Midrange banks, on the other hand, generally can't afford much [in the IS line] that is unique — and there really isn't all that much available to them that is unique. Outsourcing doesn't raise the same concern."

IBM's "longtime interest in the retail segment" and particularly Zale's belief "that IBM could bring some technology partnering to the deal" weighed heavily in the retailing player's decision to sign with ISSC, Karney said.

> "WE STILL believe . . . IBM is seriously committed to the retailing industry."
>
> DAVID KARNEY
> ZALE

In late 1988, Karney left his post as vice president of MIS at Dallas-area general retailer Southland to join Zale in pursuit of "an opportunity to get into specialty retailing, which is an area I've always wanted to move into," he said [CW, Nov. 14, 1988].

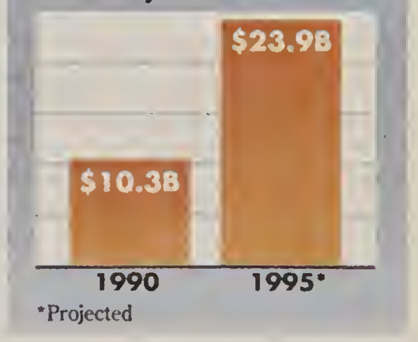
At that point, Karney said, Zale had efforts under way for a new retail information system and a new generation of in-store point-of-sale systems. These systems are now in place.

Last week, he confirmed that he was seminal in spearheading Zale's decision to outsource; he will remain in place as part of the new Zale/ISSC team.

International acclaim

The outsourcing wave has spurred a multibillion-dollar worldwide market in facilities and operations management

Worldwide market size by revenue



*Projected

CW Chart: Doreen St. John
Source: Ledgeway/Dataquest

First ever

Negotiations with IBM, then bidding against "several major [outsourcing] providers," began in April, Karney said. This makes the deal the first to be initiated with IBM but consummated with ISSC.

"Frankly," Karney said, the midnegotiation creation of the outsourcing subsidiary "was kind of neutral to us. We still believe what we believed before: that IBM is seriously committed to the retailing industry."

Karney's sanguine opinion was not universal, even within Texas borders. "This contract is going to be very controversial," said Darwin Deason, chairman of Zale neighbor and ISSC competitor Affiliated Computer Services, Inc.

Deason's firm is one of several that are trying to spearhead a government investigation into IBM's outsourcing business.

Two days after the ISSC/Zale agreement was announced, Deason commented, "We've got a group in Washington today meeting with [the Justice Department]. You can be sure that Zale is one of the subjects they are discussing."

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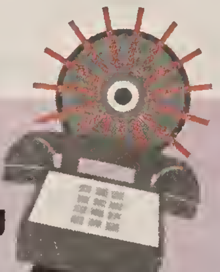
Press releases we never finished reading

"Announcing Worksheet Optimizer 'The Weight Loss Program for Fat Worksheets!' Targets Lotus 1-2-3 Release 2 Users. Makes worksheets faster and smaller."



Plainly speaking

What's the biggest problem with speakerphones? 200 executives from 1,000 large U.S. companies say:

50% Lack of privacy

34% Poor voice quality

12% Feels patronizing or impersonal

4% Don't have speaker's full concentration

GREAT NAMES GREAT NAMES GREAT NAMES GREAT NAMES GREAT NAMES GREAT NAMES

Caesar's Tahoe Resort
Rod Luck, Director of MIS

Finlay Fine Jewelry Corp. (New York)
James J. Love, Vice president of MIS

Alban Tractor Company (Baltimore)
Thomas Gear, supervisor of systems and programming

w.y.s.i.w.y.g.

What will they think of next?

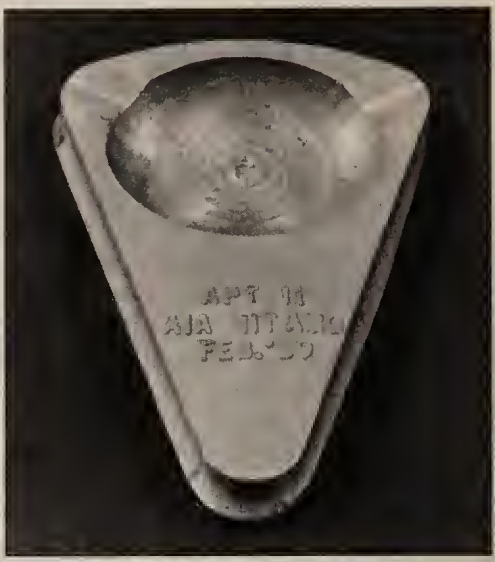
A couple of unfinancible business plans venture capitalist Robert Kunze has received:

- ✖ **A semiconductor chip that would make a great guitar pick if it failed.**
- ✖ **High-technology knee pads for Catholics (endorsed by Rome) with a side market – gardeners.**

TRIVIA TIDBITS

1. The word modem is formed from what two words?
2. Is Silicon Valley south or north of Route 128?
3. A famous computer pioneer was also an opium addict and gambler. Was it Alan Turing, Ada Lovelace or Norber Weiner?
4. What computer-related book won a Pulitzer Prize?

1. Modulator and demodulator. 2. South. 3. Ada Lovelace. 4. Soul of a New Machine by Tracy Kidder



The Computer Museum, Boston

Butt seriously: The aluminum ashtray (at right) was made in 1959 at MIT and is the first object produced using computer-aided design. Upon the ashtray's debut, the *San Francisco Chronicle* wrote: "The Air Force announced today that it has a machine that can receive instructions in English, figure out how to make whatever is wanted and teach other machines how to make it. An Air Force general said it will enable the country to 'build a war machine that nobody would want to tackle.' Today it made an ashtray."

ACRONYM HELL

Ever wonder what computer acronyms mean in other industries?

CAM
Clean Air Movement
Coalition for Apostolic Ministry

CISC
Canadian Institute for Steel Construction
Construction Industry Stabilization Committee

PC
Perciconia circinata (toxin-producing fungus)
Plasma cell (oncology)
Poor Clares (Roman Catholic women's religious order)

SAA
Serum Amuloid A (clinical chemistry)
Sex Addicts Anonymous

SNA
Saudi News Agency
Student naval aviator

▶ Do you have anecdotes about your users, your boss or your job? Know any industry trivia? If so, please contact Lory Zottola at (800) 343-6474. If we use your ideas, we'll send you a gift.

(Sources: Accountemps; *Nothing Ventured* (Harper Business), special thanks to the Computer Museum, Boston)

INSIDE LINES

DOS 5.0 debut or duel?

▶ DOS 5.0, the Microsoft version, is slated to arrive in New York tomorrow with a flourish. Microsoft plans to speed the acceptance of the new version by distributing an upgrade-only version through the retail channel — a first for the company. The upgrade will sport a retail price of $99.95. One day later, IBM is expected to announce its version of DOS 5.0; according to an IBM source, it "will be identical but not identical" to MS-DOS 5.0. IBM, of course, has Micro Channel Architecture hardware and, most probably, OS/2 Version 2.0 considerations to address. Both versions of DOS are expected to be compatible, however.

Do it yourself!

▶ Apple is readying the release of Tech Tool, a hand-held diagnostic box that plugs into the Macintosh's small computer systems interface port and can determine what is wrong. The unit, formerly called The Black Box, will go out to service providers in September and to everyone else next year. The Cupertino, Calif.-based firm is also working on a network design simulator tool to help during systems design.

Can't make up their minds?

▶ Sources at NCR say its System 3125 notepad is still changing, despite a June 24 announcement date. In the last two weeks, NCR has killed an optional 20M-byte hard drive. Also, reports that the Intel 80386SL-based box will have a six-hour battery life are wrong; NCR is only telling customers it will reliably last four hours. The sources did say that when unveiled, the box will weigh 3.9 pounds and use a flash memory card.

Transition casualty

▶ Several rumors out of AT&T say the company has killed a ready-for-market 3B2 follow-on board based on a new Mips Computer Systems chip set. The follow-on board would have allowed users to upgrade easily to the Mips-based System 7000, which AT&T gets via OEM channels from Pyramid. This would not be compatible with NCR's System 3000 family. Instead, AT&T will speed development of an alternate Intel I486-based board to migrate 3B2 users to the System 3000.

Live and under the Sun

▶ Lotus is scheduled to announce tomorrow a real-time version of 1-2-3 for Sun Microsystem's Unix. Also participating and demonstrating related products will be Teknekron Software Systems, Sybase, Reuters Information Services, EJV (a consortium of Wall Street firms) and FDX/Telerate System, Inc.

Put your whetstones in this!

▶ Speaking at the debut of Intel's newly announced I860 XP RISC chip, Gordon Bell, chief scientist at Stardent Computer, said the chip could create 16 three-dimensional teapots per second on Stardent's Vistral workstation. Two years ago, he explained, Stardent's I860 XR-equipped Titan could produce no more than two teapots per second for four times the Vistral's $20,000 price tag.

Information at whose fingertips?

▶ A proud Lotus last week unveiled demos of its long-awaited 1-2-3 for the Apple Macintosh and 1-2-3 for Windows alongside 1-2-3 for DOS before a large crowd of major corporate accounts. In the midst of these demos, however, a mortified Lotus watched its 1-2-3 Windows demo blow up, one user reports. The culprit was not the application but the dreaded UAE, or Unexplained Application Error, that plagues Windows users from setup to shutdown, often for no ascertainable reason. Further proof, perhaps, that the long arm of Microsoft reaches everywhere?

Gil 'Just call me Alexander Haig' Williamson is apparently firmly ensconsed at the helm of the merged NCR/AT&T computer operations, according to analyst Tom Nolle at CIMI, who says progress reports scheduled to be released today will show NCR running the show. Nolle said AT&T executives who have carped to AT&T corporate about NCR President Williamson's order-giving have been told he is in command. News Editor Pete Bartolik says, "I'm in command here" at the Computerworld *information exchange [telephone: (800) 343-6474; fax: (508) 875-8931; and Compuserve: 76537,2413], where you can pitch tips, ask questions or gripe about coverage.*

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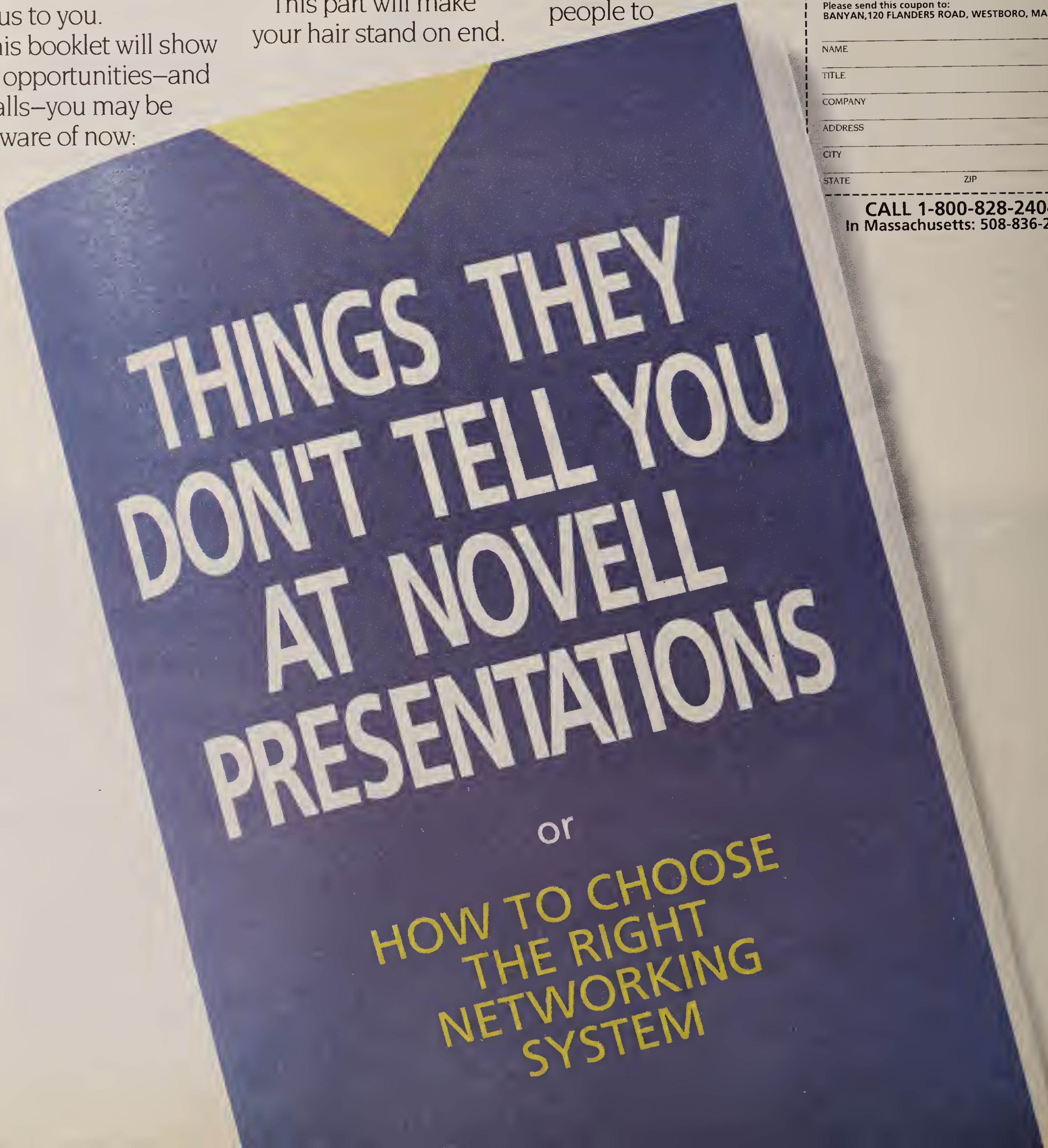
In Massachusetts: 508-836-2828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or
HOW TO CHOOSE THE RIGHT NETWORKING SYSTEM